DOCUMENT RESUME

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TITLE	[The Pioneer Student Textbook for the Mohican School in the Out-of-Doors. A Teacher-Guided Study in Your Outdoor Laboratory.]
INSTITUTION	Mohican School in the Out-of-Doors, Perrysville, Ohio.
SPONS AGENCY	Martha Holden Jennings Foundation, Cleveland, Ohio.
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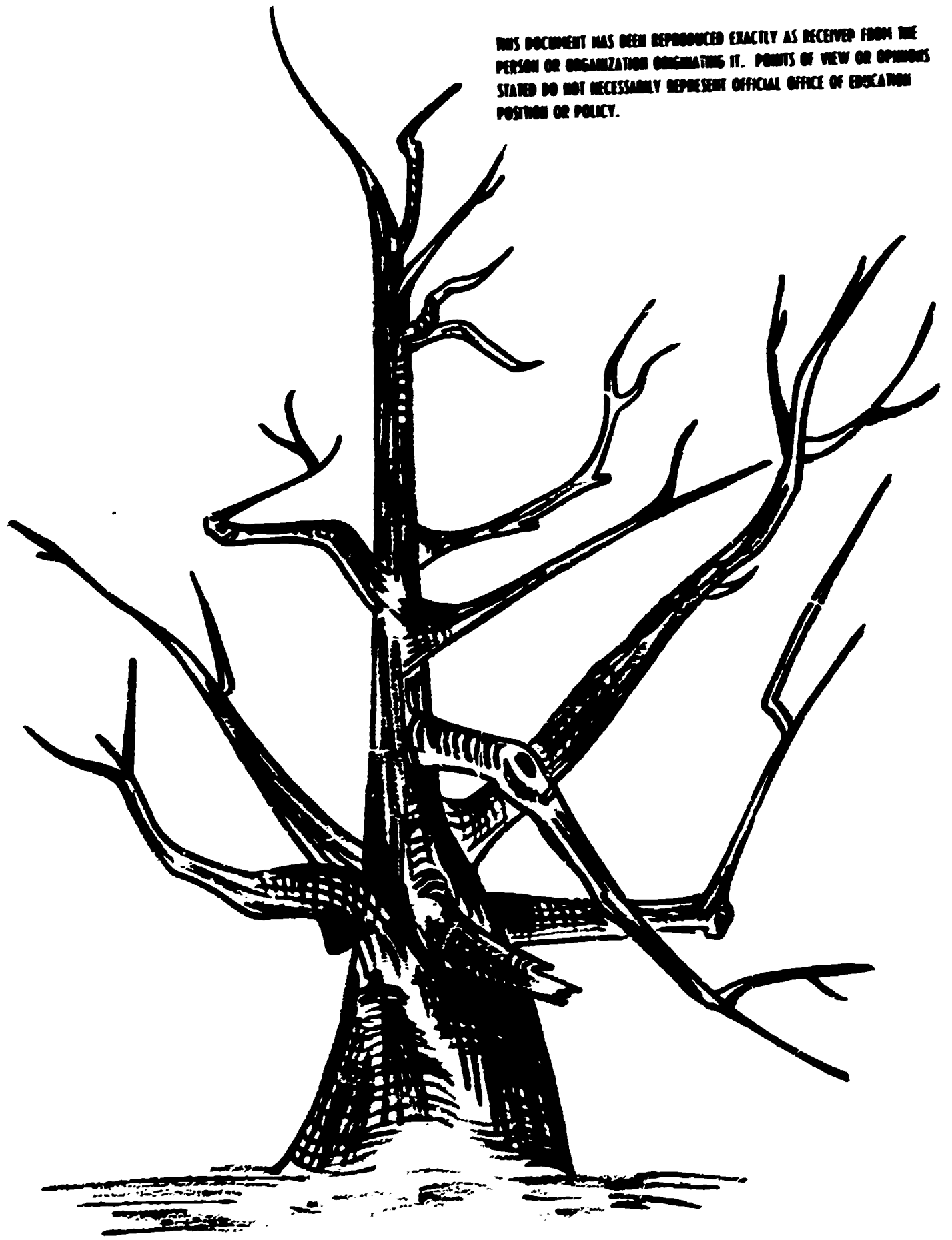
ABSTRACT

Intended for pre-camp preparation and in-camp studies, this test presents to the student a description of the daily community life at the Mohican School in the Out-of-Doors at Perrysville, Ohio. Assignments and study topics include (1) history, (2) creative expression with sketches and poetry, (3) botany, (4) birds, (5) soil, and (6) weather. Numerous illustrations and charts supplement the written materials. Related documents are RC 004 245 and RC 004 247. (BD)

the PIONEER

STUDENT TEXTBOOK

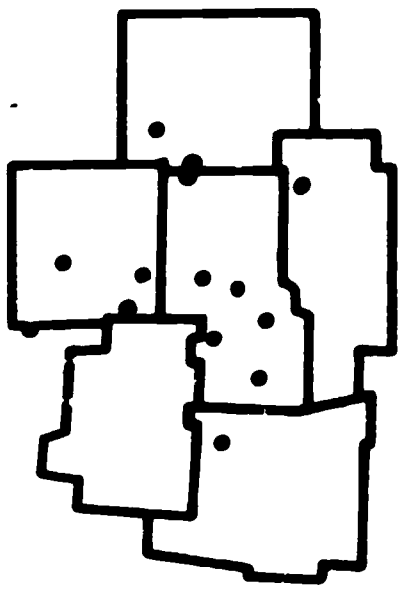


NAME - _____

DATE - _____ _____

MOHICAN SCHOOL IN THE OUT-OF-DOORS

OUTDOOR EDUCATION PLACES THE STUDENT IN THE WORLD'S BEST EQUIPPED LABORATORY. HERE, FIRST HAND EXPERIENCE IS CONTINUALLY AVAILABLE. HERE, TOO, AN APPRECIATION FOR THE PRESERVATION OF OUR RAPIDLY DIMINISHING OUTDOOR INHERITANCE CAN BE LEARNED.



1969-70

Mohican School In The Out-Of-Doors
McCurdy Road
Route # 2
Perrysville, Ohio 44864

Dear Student:

The wonderful outdoors was man's first school room. It was there where man first learned to survive and became the superior animal. It was there where he learned to use his intelligence to keep warm, dry, find shelter, food and build great civilizations.

Today we spend much more time indoors than our forefathers did. In most respects we know far less about the outdoors than did our forefathers. Yet, the outdoors is very important to us. Our very lives depend on the living things, most of which are grown outdoors. We, also, use the outdoors for physical recreation and mental and spiritual re-creation.

We will soon be studying together outdoors. The lessons will be learned differently than the ones you learn in your classroom, but they will be no less important. Our work at the outdoor school is a part of your year's schooling. Think of this experience as being *outdoor* education. We will move you to a camp in order to study some subjects that are better learned in an outdoor situation. We will use the outdoors as a laboratory.

We are giving you this booklet a few weeks before you come to the outdoor school so that you can read it and be thinking about the experience.

The history of the Mohican School goes back to 1961 when Madison Local Schools started an outdoor education program. In 1964, a county committee was formed to open an outdoor school. The Martha Holden Jennings Foundation of Cleveland financed the committee expenses. A three year federal grant was secured under the Elementary - Secondary Education Act of 1965. For three years the Mohican School was a Title III project (innovative and exemplary programs). In 1969, the Jennings Foundation again came to the aid of the program. The Mohican School has been sponsored by Springfield Township Schools since 1965.

We of the permanent staff of the Mohican School sincerely hope you enjoy your stay at camp. With your co-operation we will learn and have fun during our week together.

Sincerely,

Ronald Reed,
Director

RR:bdr

This textbook is dedicated to Gina Gibney for winning the 1968-69 poetry contest with the following entry:

MEMORIES

Have you ever walked through the woods at night,
And rustled the leaves that scared the birds into flight?

Have you ever seen the raising of Old Glory,
Or at night have your counselors tell you a bedtime story?

Have you ever been in an old cemetery,
And read the dates while you tarried?

Have you ever visited an old abandoned farm,
Or slide down the hay shute in the old barn?

Have you ever been out to feed the old goat,
Or have pond ecology in a glass bottom boat?

Have you ever rolled down old Misery Hill,
Or wished at night things weren't so still?

Have you ever talked about water conservation,
A problem that is spreading across the nation?

Have you ever made a casting on sand,
And decorated it so it looked just grand?

Have you ever made a great new friend,
Or have your very own job to attend?

All of these things I shall remember,
Of my trip to the Mohican School in November.

Gina Gibney
Stingel Elementary
Ontario, Ohio

TABLE OF CONTENTS

Please note: The textbook includes colored pages for a purpose. Generally speaking, the white pages are to be read and/or filled out before the students attend the outdoor school. We may refer to the white pages during outdoor school sessions but they were written to help in pre-camp study. The other colored pages will often be used at the outdoor school depending, of course, upon the season. Many classes with unusual emphases or special seasonal activities will include handouts which are not a part of this booklet. Special handouts will be inserted into the textbooks when they are used. Pages marked with an (*) can, also, be used for follow-up activities by students at home, at their schools or on field trips after the outdoor school experience.

"It takes all sorts of in an outdoor schooling
To get adapted to my kind of fooling."

Robert Frost

DAILY SCHEDULE
1969-1970

7:15	Reveille
7:25	Weather Reading
7:55	Flag Raising
8:00	Breakfast
8:40	Camp Kapers
9:15	First Activity Period
11:30	Weather Reading
12:00	Dinner
1:00	Teacher Time
2:00	Second Activity Period
3:30	Weather Reading & Option Time
4:30	Rest Period
5:25	Flag Lowering
5:30	Supper
6:45	Evening Program
8:15	Social Time
8:45	Dismiss for bed
9:15	Lights out

PERMANENT STAFF:

Ronald Reed, Director
Mrs. Betty Rader, Secretary
Mrs. Beatrice Sellner
James Splete
David Tucker

RESOURCE PEOPLE

Richland Astronomical Society
Local Ornithologist
Parents
Richland County Game Protector
Richland Soil & Water Conservation District
Richland County Agriculture Extension Service

Ohio Department Natural Resources Wildlife
Division - County Game Protector
Ohio State Department of Education
Ohio Conservation & Outdoor Education Association

United States Department of Agriculture
Soil & Water Conservation Service
United States Department of the Interior Fish &
Wildlife Service

COMMUNITY LIFE AT THE OUTDOOR SCHOOL

I Before Breakfast

1. All students are to remain in their dorms and quiet until the reveille bugle blows.
2. Students should not waste time after reveille. When the next bugle blows, report to the flag pole. Do not be late for flag raising.

II Dining Room Procedure

1. At mealtime students are to walk into the dining room and stand behind a chair at their assigned tables. We will sing, say or have a silent grace.
2. After grace, students are to remain standing, and will be called by tables to go and get their food, walking down the center aisle. Food is served cafeteria style, each student saying in a nice clear voice what he'd like, and if he doesn't care for something saying "no thank you." Everyone remains standing until all from his table have returned.
3. Table manners are important and make for more pleasant eating.
   a. Students are to put napkin on their lap and use it when necessary.
   b. When seated, begin by passing milk, butter, salt, pepper et cetera to the right. This avoids confusion.
   c. "Please" and "thank you" are always used when asking for something to be passed.
   d. Bread is broken before being spread.
   e. It is impolite to talk with food in your mouth.
   f. It is improper to put elbows on the table until all have finished eating.
   g. When everyone at the table has finished the main part of the meal, dessert is eaten all together.
   h. It is proper to say "please excuse me" if you need to leave the table.
4. Quiet, but many happy voices in the dining room make eating an enjoyable time of the day.
5. Every table appoints two different students at each meal for clean-up (everyone should have an opportunity to participate).
6. All students will be dismissed by tables from the dining room.

III Rest Period

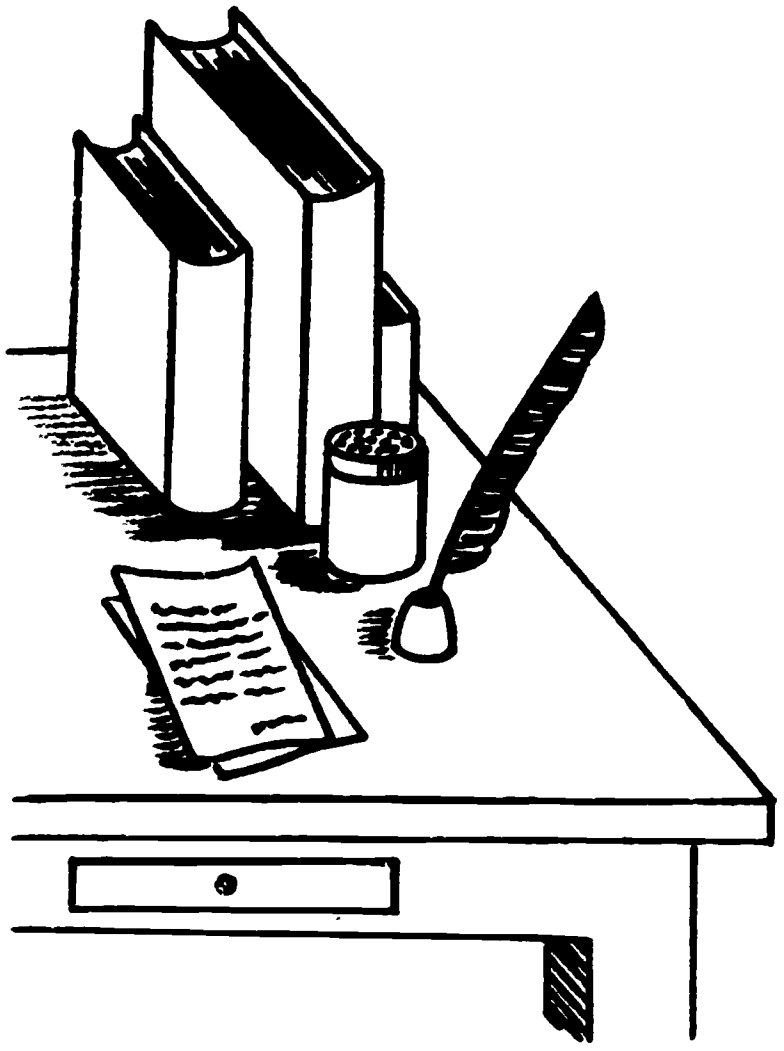
1. All students are to remain in their dorms during the rest period. Students may quietly work on or read their workbooks or library books at this time.

IV Jobs

1. All of us have jobs to do to keep our community running smoothly. Your job (camp kaper) is important, do it every day.

V At the Cemetery

1. The graves you will see at the cemetery are memorials to the brave pioneers who tamed our early wilderness. There may be no living relative who remembers some of the people whose remains rest there, and the markers may be the only record that these people ever lived. Do not erase history by rubbing your hand across the stones. Walk quietly, talk quietly, and treat the last resting place of these forefathers with respect.

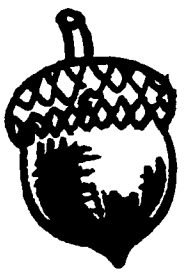


OUR SENSES

While we are at camp we want to use our eyes, nose, ears, tongue, and fingers to learn. Our senses are very important in learning about things, but some of us do not use them. Often we do not listen, we do not look, or we miss a smell. While at camp - be alert - tune in your senses - you will learn more!

We LOOK, LISTEN, and THINK for ideas in our Language Arts Classes in Outdoor Education. We could call LOOK, LISTEN, And THINK our text books. Sometimes we will use one, sometimes all three. Their use is unlimited because they have so many "pages."

Language arts includes anything we do that is creative including singing, sketching, storytelling, journal keeping, writing stories or poems, and discussing the people who lived there years ago. You can see that our class sessions will be varied and interesting with so many things to do in so few days.



SOME INTERESTING HISTORY

"After a hundred years
Nobody knows the place -
Agony, that enacted there,
Motionless as peace. . ."
Emily Dickinson

Little do we realize that the history of our own counties have many interesting facts and thrilling adventures just waiting for us to discover. No national government was formed here, and no famous Indian war was fought here, but governments were formed, and the pioneers *did* fight the Indians in our counties. These and many more interesting things happened in north central Ohio; so let us in an attempt to better understand the present, pause to appreciate the past.

Ancient Indians

Indians lived in what we now call Richland, Ashland, Crawford, Knox, and Huron counties for many many years. The Mound Builders, considered to be some of the most advanced Indians of ancient times, lived in Ohio. Mounds built by these ancient Indians have been found right in our counties. A famous mound is located south of Fredericktown. About four miles west of the outdoor school two of these mounds have been discovered--one was eighty feet high! Some of these mounds were used as burial grounds by the Indians, and often the Indians buried the dead person's belongings with him in the mound. Clay pots, pipes, tools and weapons have been discovered as a result of opening such ancient graves.

While improving a road in the mid-1800's, pioneers discovered the bones of an ancient Indian who had been seven feet tall! The bones were discovered just a few miles west of the outdoor school.

As you walk over the paths of our school grounds you are on ground that was used by these ancient Indians many centuries ago. Who knows what discovery we of the Mohican School In The Out-Of-Doors might accidently make that would reveal life of long ago?

Late in ancient times the Erie Indians controlled most of what we now call Ohio. Later the Iroquois used Ohio mostly for hunting only. Ohio remained unsettled for years until the eastern Indians began to migrate across the state on their way west.

Recent Indians

The more recent Indians are not such a mystery to history because the white man recorded things about them first hand. Our counties were at one time or another the hunting grounds for the following tribes: Wyandots, Hurons, Ottawas, Delawares, and Shawnees. The Delawares had entered the state about 1750, held control of what we now call the outdoor school, and were the largest tribe in Richland County in 1764 - numbering about 600 warriors plus their families.

The best known Indian village of Richland County was a Delaware Settlement just a few miles from our school called Greentown.

In 1790, these Indians joined others in a war against the white man and were winning until "Mad Anthony" Wayne, sent by President Washington, defeated them in a battle in Northern Ohio called Fallen Timbers. Following Fallen Timbers the Indians signed the Treaty of Greene Ville and the Delawares of Richland County returned home.

Greene Ville Treaty

The southern boundary of Ashland County is a portion of the original Greene Ville Treaty line. The line was established at the Treaty of Greene Ville signed August 3, 1795 by General Anthony Wayne and several Indian chiefs. The treaty reserved all lands to the north of the line as Indian Lands and the Indians gave up all claims to the land south of the line for pioneer settlement. It is one of the most important treaties between the United States and the Indians. It, also, opened the way to the settlement and statehood for Ohio. The line crosses the 3 C Highway about six miles south of Loudonville.

After Wayne had defeated the Indians at Fallen Timbers in 1794, he moved into Fort Greene Ville for winter quarters. During the next spring and summer Wayne and the Indians met in many meetings to work out the peace details. By July, 1,130 Indians had gathered. Many famous Indians of the day were there: Blue Jacket, Little Turtle, Black Hoof, Bad Bird and others. In August, the treaty was signed and sent to President Washington for his signature. Days of feasting and passing the peace pipe followed. The Indians were promised the lands north of the line, $20,000 worth of supplies, and a $9,500 payment yearly forever. The Indians lived up to their promises at Greene Ville much better than the pioneers and the United States government did. None of the Indian signers of the treaty ever fought the pioneers again and the Indians respected the line and moved north. However, the pioneers soon broke the agreement and crossed the line and the government later broke its promises and pushed the Indians farther west.

Famous Indian Names

Captain Pipe was of the Wolf branch of the Delawares and one of their fiercest fighters. He was chief of a village near what is now called Jeromesville. He once helped paint a white soldier (named Col. William Crawford) black with paint before burning him alive at the stake. Pipe leaped with joy and laughter as the soldier died. He later became a Christian and lived peacefully in Richland County for the rest of his life. He even warned the whites once of a possible Indian attack. Captain Pipe, no doubt, traveled over our camping area many times.

Another of the Delaware chiefs was called *Thomas Armstrong* and had been educated by the pioneers. He was of the Turtle branch of the Delawares and once was chief of Greentown. It was said by some that he was a white man who had been captured as a boy by the Delawares and raised as an Indian.

Tom Lyons or "Old Leather Lips" was the name of another well-known Indian of Greentown and this part of Ohio. Much mystery surrounds the background of Tom Lyons. Confusion by historians is understandable because Tom Lyons was vain and boastful and loved to tell tales about himself. Some of the tales were no doubt created by Lyons himself and were not true, but where truth begins and fiction ends, nobody seems to be quite sure. He was described as the ugliest human being ever seen; with elephant-like skin and a thick lip that drooped over his chin. It was considered bad manners for pioneers to lock their doors at night and often in the early morning they would find "Old Leather Lips" sitting in front of their fireplace helping himself to their food! He claimed and boasted of having killed 99 white women and he was supposed to have the 99 tongues of his victims hanging on a string. Lyons used this string of tongues tale to frighten many early pioneer women. He would wander up to a cabin when only the women of the house was at home and begin boasting. His boasting always gained him some food! How Lyons survived as long as he did

living near the whites is a real wonder. His very name was used to frighten young boys when they would not behave. His looks, his boasting and bad manners angered and frightened the early pioneers.

Lyons was an old man when he came to this part of Ohio. It is said that he may have fought in the Revolutionary War. While in Richland County he lived for a-while in a cabin along the Clear Fork River in Worthington Township.

There are many accounts of how Leatherlips died. One historian claimed he died on an Indian reservation in 1824. Other historians claim he was murdered. One murder tale has it that Lyons was shot and buried in a swamp. Another murder tale accounts his death occurring near Haniwalt Mill, near Lexington. After a drinking and boasting spree in a Lexington Tavern, he was followed by some pioneer roughnecks and murdered. An interesting gravestone was found once near Haniwalt Mill in a pioneer cemetery. The stone gives an account of an old Indian being buried nearby.

No matter which tales are true or which are not; Tom Lyons or "Old Leatherlips" remains the most colorful Indian of our past.

More Indian Facts

The Indians of this area grew corn, potatoes, and melons. The work in their gardens was done by the squaws. The warriors did the fighting and hunting. The Delaware warriors nicknamed themselves *Leni-lenape* which means "real men." The warriors loved to hunt bear, deer, and turkey. Their sports consisted of races, games of ball, throwing the tomahawk, shooting the bow and arrow, and horse races. They believed in one God called the Great Spirit, and worshipped him in colorful ceremonies.

When the War of 1812 broke out between the United States and Great Britain, the frontier settlers became uneasy about the presence of Indians near their homes. The Indians were inclined to fight on the British side in the war. Blockhouses were put up in different spots for protection as news spread all over the state that an Indian chief by the name of Tecumseh was uniting all tribes to go on the warpath. Actually Tecumseh's Indian forces had been defeated at Tippecanoe the year before (1811), but the pioneers still feared the power of the Shawnee warrior.

Fear broke out among many of the Richland County settlers that the Indians of Greentown might join Tecumseh and the military authorities decided to destroy Greentown. There were about 100 Indians at Greentown at the time and they had been peaceful since Fallen Timbers. A Captain Douglas was sent to make the Indians leave their village. Fearing trouble, Douglas went to gain the assis-tance of James Copus, a pioneer who lived near the Indians and had taught the red men Christianity. The Indians loved and respected Copus and believed him to be an honest man. Douglas forced Copus against his will to talk the Indians into leaving their village. When the Indians had left, a few deserters from Captain Douglas's garrison set fire to the village without any good reason. As the Indians turned and watched their homes burning in the distance they felt that they had been betrayed. This occurrence made enemies out of many of the peaceful Greentown Indians.

The Indians were taken to Mansfield and put under guard where one warrior and his daughter promptly escaped. Two soldiers followed the Indians and shot the warrior, scalped him, and then cut off his head and placed it on top of a pole in the middle of Mansfield.

North of what is now our school location lived a family by the name of Zimmers. The Zimmer family was one of the earliest to settle in this area, having arrived

in 1809 about the same year as the family of James Copus. Seeking revenge for the burning of Greentown, a group of Indians walked into the Zimmer cabin one afternoon and murdered the entire family of six (including a friend that had been there visiting them, excluding the son who had been sent for help when the Indians had been seen coming.)

Next the Indians turned on their old friend James Copus who they believed was responsible for the destruction of Greentown. They surrounded the Copus cabin and fired upon it for hours before giving up. When the battle was over a number of men were dead, including ten Indians and James Copus, who had been wounded and died in his own bed.

About this same time a grocery store owner was murdered and scalped on North Main Street in Mansfield by a group of Indians seeking revenge.

So you see our area has had its share of pioneer and Indian adventures as the white man tried to settle this part of Ohio.

Early Richland and Ashland Counties

Probably the first white man to set foot in our county was James Smith in the mid 1700's. He had been captured by the Indians in Pennsylvania, adopted and brought through here on a hunting trip. Richland became a county in 1808, but had no government until 1813. At first Richland County included what we now call Ashland County. In 1812, Mansfield numbered about 12 families.

The first settlers to come to Richland County arrived in about 1807. They settled near the Black Fork, the Clear Fork, (near Bellville) and the Rocky Fork (near Lexington). In 1808, Richland County was called Madison Township.

The village of Mansfield was surveyed and laid out by Gen. James Hedges, Jacob Newman, and Joseph Larwell in 1808. The first house built in the village was put up by Samuel Martin in 1808, but he was caught illegally selling whiskey to the Indians and had to leave the area. Mr. and Mrs. James Cunningham moved into the Martin house and in August of 1809, Mrs. Cunningham gave birth to the first white child born in Mansfield. She was named Matilda. The first male child was born to Mr. and Mrs. John Gilkinson in 1811.

The first house was built where the square is today and much of the activity of the village centered around that area. A blockhouse was erected there early to protect the settlers from Indian attack. The first post office business was conducted on a large stump near the blockhouse. Lots were first sold in 1808 and in 1815 twenty-four houses stood in Mansfield. Two of the houses were blockhouses. In 1827-28 the village had grown to 270 people!

Early Crawford County

Crawford County was named after Col. William Crawford, a personal friend of George Washington. Crawford was in charge of a force of soldiers who fought the Indians in Ohio during Washington's administration. During one battle Crawford was separated from his men when he lost his way in tall grass. He was captured and tortured to death. Crawford County was organized in 1820 when an old Indian Territory was divided into several counties. Bucyrus was made the county seat.

Early Huron County

Huron County was created in 1809 by the state legislature and the county was a part of what was called the firelands. A large tract of land was granted by the

state of Connecticut to people whose homes had been burned by the British during the Revolutionary War. In 1811, the county was enlarged. The first meeting of commissioners took place at Avery in 1815. The name Huron came from the French. The French called the Wyandot Indians - Hurons. The county once included part of Erie County.

Early Knox County

Knox County was created by the Ohio Legislature in 1808, however, the area was named Knox as early as 1800. When the Indiana Territory was formed an area of land named Knox was taken from the Northwest Territory and added to the Indiana Territory. In the early days it was much larger than today and included other counties. Officially Richland County was once governed by Knox County. Fredericktown is in Knox County and Wayne Township. Wayne Township was named after Mad Anthony Wayne. In 1840, Fredericktown had a population of 500.

Johnny Appleseed

"Models for men, if they
would build the world
As Johnny Appleseed would
have it done. . ."
Vachel Lindsay

No account of early Richland County and nearby area would be complete without mentioning the most famous of pioneers from the area--John *Chapman*, or as he was better known - Johnny Appleseed. This man is known all over the United States for his adventures and deeds as a pioneer.

John Chapman was born in Massachusetts in 1775 and followed the frontier all his life. He left New England when it was "too civilized" and moved into Pennsylvania where he lived for a few years. When that state became too crowded he moved to Ohio and later to Indiana where he died in 1847.

He was kind, gentle and good-hearted man who was restless and loved to talk. His eyes were dark and he always wore old torn clothes. It was said he wore an old tin bucket on his head in which he cooked his meals while in the wilderness. He seldom wore shoes in summer or winter. He carried no weapon and he never killed anything, yet, he usually traveled alone in early forests full of wild animals. He was called "Appleseed John" because of his love for trees. He seemed to think it was his duty to plant fruit trees ahead of the pioneers so they would have fruit growing when they settled the land. He always carried a bag full of seeds. He would, also, return to his trees every so many months to see how they were doing. This business kept him on the move constantly.

The Indians called him the "Great Medicine Man" and he never had any trouble with the red men. He was a preacher of the Swedenborgian beliefs. Johnny thought he could talk to the dead of the "spirit land," and it was said that the reason he never married was because two of these female spirits were supposed to marry him after he was dead--*and so he waited!*

He spent much time in Richland County where he had relatives, and in Worthington Township where he had many friends. He visited the Zimmer family just before they were scalped. Probably Johnny Appleseed walked on the ground that we are walking on while at camp. See if you can find any apple trees! He became a hero in Mansfield when he walked barefooted from Mansfield to Mount Vernon to get a garrison of soldiers to come and protect the Richland County settlers from a possible Indian attack. He made it there and back in one night, even though he stopped at each home to warn them of the Indian uprising.

We have recorded just a few of the interesting things that happened in early north central Ohio, but now we have a better idea of how these early pioneers lived and what adventures they went through in the settling of our counties.

Muskingum Conservancy District

The Wooster Presbytery Camp, the Mohican School site, is located near the Pleasant Hill Lake. The lake is a part of the Muskingum Conservancy District. The District includes 14 dams and several lakes or reservoirs located from Charles Mill Reservoir near Mifflin southeast to the Ohio River. The main purpose of creating the district and building the dams was flood control. Other benefits have been storage of water, recreation, reforestation, and beauty.

Pleasant Hill Dam was completed in 1935 and the lake provides many hours of recreation to thousands of people each year.

Mr. Ronald Reed

Credit should be given to the Ohio Genealogical Society, the Richland County Historical Society, the Mohican Historical Society, the Mansfield Public Library, and the many articles, histories and individuals, too numerous to mention, who were helpful to the above writer.

* * * * * * * * * * * * * * * * *

JOURNAL PAGE

MONDAY, _____

TUESDAY, _____

WEDNESDAY, _____

JOURNAL PAGE

THURSDAY,_____

FRIDAY,_____

GRACES

Grace before meals is a personal thing. We at the outdoor school believe that those who want to join in a unison type grace can, and those who do not, need not. Sometimes we will have a silent grace for those who want to do it in a special way. No matter what our personal feelings are - we at the outdoor school are thankful that we have food, shelter and a good life. Because we <u>are</u> so fortunate - we give thanks. Be thankful to whom you please; in any way you please; when you please - but be thankful.

The Board is Spread

(Morning, Noontime, or evening) is here,
The board is spread.
Thanks be to God
Who gives us bread. Amen

Thanks

Thank you for the world so sweet;
Thank you for the food we eat;
Thank you for the birds that sing;
Thank you, God, for everything.

Johnny Appleseed

Oh, the Lord is good to me
And so I thank the Lord
For giving me the things I need,
The sun and the rain and the appleseed.
The Lord is good to me.

Hark

Hark to the chimes
Come bow your head.
We thank you Lord
For this good bread. Amen

Our Bread

Back of the bread is the flour,
And back of the flour is the mill,
And back of the mill is the wind and the rain
And the Father's will.

STUDENT POETRY

The following poetry was written by former students who have won the annual poetry writing contest.

THE WHITE VIOLET

There was a certain graveyard, in a certain place,
That had a certain violet all over its face.

Its color was blue, its size was small,
But as it grew, its pride grew tall.

But along the path that led to the gate,
There was a violet that had no mate.

Its color was white, its size was small,
But I don't think it grew very tall.

When the flower died from someone's step,
The other violets tried to cover the spot it left.

Sheila Kaufman, 7th Grade
Wooster Heights, 1961
Madison District

(Published in 1962 Spring Issue of The Posey Book)

THE BIG PINE

The pine tree stands bearing its cones,
And Mary lies under the tree,
Her marker turned with age.
Violets grow wild, the air smells of pine,
But yet, there is something so close and near.
It might be the wind whipping through the trees
Or a stream running clear.
Yet, the sweetest thing of all to hear
Is nature whispering in your ear.

Dennis Wilt, 7th Grade
Wooster Heights, 1962
Madison District

THIS LAND

It thrills me when I walk
this land,
To think that men of old,
Have trod this place to
make for me
A better life and home.

There were the Hershes and
the Kellers,
The Maglotts and the Kellers;
Who all have helped to build
the way,
For a strong and free America
For us who live today.

Linda Miller, 7th Grade
Madison Jr. High, 1963
Madison District

THE OLD CHURCH

There was a church that stood so bright,
  But died away on the clearest night.
With all the fight and all the might
  To keep the church so nice and bright,
With just one sparkle it was gone.
  It is never to be seen again.

Yet, the tree that stood so bright
  Is standing still to the best of sight.
The markers are there still,
  And the beauty of time is passing away.

Sandra Williams, 6th Grade
Wooster Heights, 1964
Madison District

NEAR A CREEK

In a creek, small animals are
  found
Snakes and salamanders are all
  around,
Birds and squirrels are found
  nearby
In the trees or in the sky.

Shelves of rock are here to see,
Most are larger than you or me.
I could sit by a creek all day.
Letting it go its own way.

Larry Long, 7th Grade
Madison Jr. High, 1965
Madison District

DON'T BE A LITTER BUG

I walked along the other day
 Watching just the moon,
I walked along the other day
 Saw a picnic paper spoon.

As I walked along the other day,
 I saw a Solomon's Seal.
As I walked along the other day,
 I saw a stray orange peel.

Much and many papers I found;
 What a sight looks the ground!
It's such a pity when you see
 Litter bugs - like you and me.

Judy Fort, 6th Grade
Woodville, 1966
Madison District

THE PINE

For a hundred or more years the pine tree has stood,
Older than most of the trees in the wood,
Guarding the gravestones as time marches by,
The pine tree has stood, higher than high.
Oh, the things the pine tree has seen -
Weddings and funerals and things that have been.
Oh, the things the pine tree has heard -
Laughter and crying and the chirp of a bird.
For a hundred or more years the pine tree has stood,
It will continue to guard the graves in the woods.

Kitty Vidra, 6th Grade
Bedford Elementary, 1966-67
Springfield Township

(Published in the 1969 February issue of Ohio Woodlands)

STUDENT POETRY CONTEST WINNER CONT'D.

MY TRIP TO THE OUTDOOR SCHOOL

For those of you who have not been
Come along and follow,
Let me take you on a trip
To the school at Hidden Hollow.

Of all the things I did that week
Some I shall remember,
Like Misery Hill and nature walks
In the scenic forest timber.

Misty mornings, crisp and cool,
Flag raising on the hill,
Hearts beating fast, heads held high
While everyone is still.

There was the old graveyard
And a pine tree straight and tall,
It reminded me of pioneers
The bravest men of all.

There is the abandoned farm house
That now stands all alone,
It once was filled with laughter
And someone called it home.

The actual trip is carefully planned
For an educational reason,
And it has proved to be worth while
At any time or season.

Phillip Edwards, 6th Grade
Stingel Elementary, 1967-68
Springfield Township

* * * * * * * * *

POEMS

*

Poems and parts of poems which express the joy and the beauty of the outdoors:

*

BUT
(A Lesson in Ecology)

*

This is a plant
So new and small
That it hardly shows
In the moonlight at all -
but
This is a rabbit
Hopping, hopping,
He smells the plant,
And now he's stopping -
but
There sits an owl
With great big eyes
He sees the rabbit
And silently flies
but
Here comes a fox
Not missing a sound
He gets ready to pounce
When the owl strikes the ground
but
Here comes the farmer
Looking things over
He gives a whistle
To his big dog Rover
So
The fox slinks away
The big owl goes -
The rabbit hops home
The plant just grows -

May Watts

I MUST NOT HURRY

I must not hurry along this road,
There is so much to see;
A crimson flower, a wrinkled toad,
A knotty, scarred oak tree.

A bubbling brook, a lacy fern,
A cobweb shimmering still;
A yellow bird whose mournful notes
Sound over vale and hill.

Because all nature's loveliness
Is very dear to me,
I must not hurry along this road,
There's just too much to see.

Betty Jean Soule

TRAILSIDE FACTS AND MANNERS

Once Ohio was a wilderness of large forests and meadows full of wildflowers, wildlife, and cut through by streams of clean flowing water. But today this has changed. As man increased in numbers the natural resources decreased. Conservation-minded people have been trying to hold back the wasteful destruction of our natural resources for many years. You are enjoying some of these resources this week at camp. Do everything you can in the future to see that good conservation is practiced in the community where you live. As a voter make sure you vote for good conservation. Begin right now to learn what conservation means and study these pages of trailside facts and manners. Conservation starts with little practices as well as big ones. Learn and practice the following:

Plants

Many students will follow you to outdoor education, and we ask that no wildflowers be picked unless by permission of your teacher. Let the students who come after you find the flowers undisturbed. Some wildflower plants do not survive if the flower is picked. The following is a list of plants that should never be disturbed: club mosses, trillium, lady's tresses, flowering dogwood, wild lillies, shooting star, bloodroot, bluebells, anemones, dutchman's breeches, jack-in-the-pulpit, and ground cedar.

It is against the law to pick any plants on public lands, state forests, parks of all kinds, and wildlife areas. On land owned by private individuals the plants are under the control of the owner and should not be disturbed without permission. If and when you do pick wildflowers, do it sparingly. If there are not more than 20 flowers of the species you want - do not pick.

Trees should never be damaged. Do not carve on trees with a knife or split or break small branches. When a tree is damaged it is more subject to disease. Be careful not to step on small trees when in the woods. Remember your friends by not letting a branch snap back into their face.

Wildlife

Song birds are those which are not valuable as game species. These birds are protected by law. Yet, it is possible for people to destroy the habitat where birds live and thus destroy the birds. Little is done to help this group of birds. You can do your share, however, by feeding these birds in the winter. They suffer losses to enemies, severe cold, starvation and other causes each year, but they increase during the breeding season and their population remains about the same unless men cut down the forests, drain swamps or in other ways destroy their homes. When this happens they disappear forever.

Game birds are those which are prized as food or for the sporty shooting they provide. This group of birds may be hunted during certain seasons to provide outdoor recreation for large numbers of people. In other words, the surplus of game birds is harvested with a gun much like farmers harvest their crops. Most game birds lay many eggs and produce big families while song birds have small families. The game birds have a larger surplus each year. Game birds are not to be harmed except during hunting season and according to the laws governing hunting. Hawks and owls are not game birds. They both do man much more good by killing mice than they do harm. They are protected by the law except where there is proof that they are harming a farmer's property.

Fish are no longer protected in Ohio by closed seasons. It has been proven that in many areas fish are more plentiful than their food supply. Therefore, people

may fish the year around as recreation. But remember fish have a habitat just like all other wildlife. Do not pollute the lakes and streams. Little things thrown into the water can do much damage.

Frogs may not be hunted during their spawning season. Turtles may be hunted all year round. Snakes are not protected by law, but they are very beneficial to man by destroying agricultural pests and should not be harmed. There are two types of poisonous snakes in Ohio. They are rattlesnakes and copperheads, but they are very few in number in our part of the state. It is best to leave snakes alone except when your teacher has identified the reptile as nonpoisonous.

Wild Animal Pets

Rarely do wild animals abandon their young as orphans. Every year, however, people find animals in the woods and bring them home to be raised as pets. The mother of the animal was probably close by watching as her babies were taken from her. Many of these young animals die after being brought home due to the fact that the people do not know what or how to feed them. If they do survive and are returned to the wild they have lost valuable lessons on how to live in the wild that would have been taught to them by their parents. Therefore, many die when returned to the wild. They are unpredictable if they are kept as pets very long and many times they get mean and harm a member of the human family. If you do find any young animals near a dead parent call the county game protector to come and get it. It is best not to touch it unless you are careful. Do not get bitten because of the danger of rabies. Rabies is a very serious disease contacted through the bite of a sick animal. Warm blooded animals can contact rabies. The disease is fatal once the incubation period is over. Humans bitten by rabid animals can be saved by taking anti-rabies shots. It is against the law to not report animal bites. Contact your local health department. There is a stiff fine for those people caught keeping wildlife illegally. There are legal ways to keep wildlife, but you should contact the county game protector if you are interested.

Litter

Remember to leave no litter behind. Get in the habit of picking up everything you find in the outdoors that does not belong where it is. Do not be a litter-bug. *"Every litter bit hurts."* Remind adults to not throw trash out of car windows etc. Keep our outdoors beautiful!

Compiled with the help of Ohio
Department of Natural Resources

* * * * * * * * * * * * * * * * *

GREEN RIVER

When breezes are soft and skies are fair,
I steal an hour from study and care,
And hie me away to the woodland scene,
Where wanders the stream with waters of green.

William Cullen Bryant

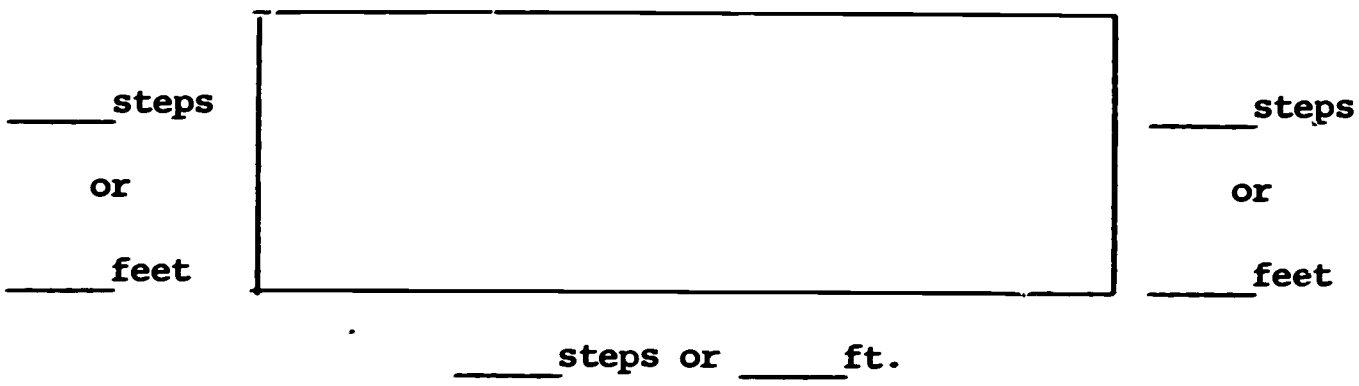
MATH HIKE

Finding the area of a field:

1. You must first find the average length of your step. It is

   _____feet.

2. Record on the drawing below the length of each side of the field.



3. Find the area of the field in square feet.

   Area = average length X average width
   Area = _____feet X _____feet
   Area = _____square feet

4. If there are 43,280 square feet in an acre, how many acres are there in this plot?

$$\frac{\text{\_\_\_\_\_ sq. ft.}}{\text{43,280 sq. ft.}} = \text{\_\_\_\_\_ acres}$$

Outdoor Estimations

1. What is the height of the porch of the lodge?

   _____ Height of the top of the lodge? _____

2. What is the length of the lodge? _____

3. How far away are several distant landmarks?

   a._____ b._____ c._____

4. Tree estimations.

	Tree No. 1	Tree No. 2	Tree No. 3
a. Height	_____	_____	_____
b. Diameter	_____	_____	_____
c. Age	_____	_____	_____
d. Kind	_____	_____	_____

Mohican Ecology

What lives in a field? What happens to the plants and animals when a field is abandoned? The natural state of nearly all the land in this part of Ohio is the mature forest. Any other stage is artificial and temporary where the forest has been altered by the forces of man or nature. When such land is undisturbed, even for one year, it begins the long gradual process of returning to forest.

Every living thing has its own special requirements. The requirements: food, living space, moisture, temperature, light, and many more. A species is eliminated when any one of these requirements exceeds its range of tolerance, and is replaced by other species better suited to the new conditions.

Why does one plant replace another in orderly succession? The living story can be traced out in the fields, thickets and woods of the Mohican School.

by Leonard J. Bradley
Audubon Camp of Connecticut

I. Life on earth requires four basic elements. What are these elements?

A. _____ and _____ _____ are two gases exchanged between plants and animals.

B. _____ is the central energy system for living organisms on earth.

C. _____ covers 3/4 of the earth's surface and makes up 2/3 to 90% of most living matter.

D. _____ is the surface layer of earth, supporting plant life.

II. Plants are the producers of food for higher types of life found on earth. What then do plants eat and how do they get their food?

A. _____ is the process by which plants produce food for themselves from the four basic elements.

B. Photosynthesis is a process triggered by the action of _____ on the chlorophyll (the green part of plant), which combines _____ and _____ _____ into _____ for plant food.

III. The type of soil plus some other conditions determine the plant life we find growing on earth. The plants in turn determine the type of wildlife which lives on an area, for every animal needs specific types of food and shelter which are provided by certain plants. What steps are

involved in the process of plants replacing each other year after year until the area is a mature forest? What effect does this systematic plant replacement have upon the wildlife in the area?

A. _____ _____ is the process of plants replacing each other as each makes certain conditions best for the growth of the next stage of plants.

B. Here are nine major steps of plant succession which you will observe at the Mohican School:

1. Starting with_____ _____ _____.

2. _____ grow on rocks, tree trunks and poor soil. This plant is actually two plants, algae and fungi living together.

3. _____many times grow on soil produced by lichens.

Why are these first three steps in plant succession in much lesser proportions than the last six?

Did you find any animal life in the first three steps? List

4. _____plants die each year with only their seeds left to replace the plant the next spring. (ex. poverty grass, fox-tail, grains like corn, wheat, etc.)

5. _____plants whose tops die above ground, but whose roots live and produce new sprouts the following spring. Their roots live more than two years. (ex. goldenrod, clover, wild carrot, timothy, dandelion, wild black berry).

List on the following page the wildlife along with their shelter and food that you observed in these field habitats.

ANIMAL	SHELTER	FOOD

6. _____ move into fields of perennial grasses and mixed herbaceous plants. Look for them in old pastures. (ex. flowering dogwood, sumac, hawthorn, crab apple).

7. _____ trees need lots of direct sunlight, grow rapidly and are found in groups competing with each other for this sunlight. (ex. aspens, cotton woods, sassafrass, cherry, & locus).

List the wildlife along with their shelter and food that you observed in this shrub and temporary tree habitat.

ANIMAL	SHELTER	FOOD

8. _____ trees grow best with some foliage over them in indirect sunlight. (ex. red maple, elm, oak, hickory, ash, walnut). On a south facing hill the hickory and oak trees will establish a climax forest.

9. _____ or _____ trees make up the mature forest on most of this land. They are the final step in our plant succession. These trees grow best in lots of shade, need only small amounts of indirect sunlight. Other trees cannot grow under these conditions, only the seeds from these large Beech and Sugar Maple trees can mature into adult trees.

Can you find a difference in growing conditions when comparing the oak, hickory forest to the beech, maple forest? List.

1.

2.

3.

4.

5.

List the wildlife along with their shelter and food that you observed in these two forests.

ANIMAL	SHELTER	FOOD

IV. Tools of management to change plant succession.

A. Man can hasten or speed up succession on an area of land by _____, or _____trees or_____ the ground.

B. Man can retard or set back plant succession by a variety of methods _____, _____, _____,_____, _____, _____, _____,_____.

* * * * * * * * * * * * * * * * *

I went to the woods because I wished
to live deliberately, to. . .
see if I could not learn
what it had to teach;
and not, when I came
to die, discover that I
had not lived.
Thoreau

This key can be used to study trees near your home or school. After you learn the vocabulary - you are ready. The numbers on the left provide you with choices. (Example: 1. - leaves opposite; 1. - leaves alternate. After you make your choice the key explains where you go to make your next choice - either 2 or 7.) By making choices from observation you will come to the name. A 10x hand lens will help.

KEY TO THE DECIDUOUS TREES-WITH LEAVES

1. Leaves opposite - 2
1. Leaves alternate - 7
2. Leaves simple - 3
2. Leaves compound - 4
3. Leaves pinnately veined, not lobed - - - - - - - - - - - - - - - Dogwood
3. Leaves like fingers, lobed - - - - - - - - - - - - - - - - - - - Maple
4. Leaves of fingerlike arranged leaflets - - - - - - - - - - - - - 5
4. Leaves of pinnately arranged leaflets - - - - - - - - - - - - - 6
5. With five leaflets - Buckeye
5. With seven leaflets - Horsechestnut
6. Leaves of three to seven, coarsely toothed or lobed leaflets- Box Elder
6. Leaflets five to thirteen entire of only fine teeth - - - - - Ash
7. Several buds clustered at tip of branch - - - - - - - - - - - - Oak
7. Buds not clustered at tip - - - - - - - - - - - - - - - - - - - 8
8. Leaves simple - 9
8. Leaves compound - 21
9. Leaves not lobed - 13
9. Leaves variable, some lobed, some not lobed on same tree - - 10
10. Leaf margin entire, twigs green, aromatic - - - - - - - - - - - Sassafras
10. Leaf margin finely toothed; twigs not aromatic - - - - - - - - Mulberry
11. Leaves pinnately veined - Tulip Tree
11. Leaves palmately veined - 12
12. Leaves with three large veins at base bark peeling in thin flakes - - - - - Sycamore
13. Leaves two ranked on most branches - - - - - - - - - - - - - - 14
13. Leaves regularly more than two ranked - - - - - - - - - - - - - 17
14. Leaves with three to five large veins from base, heart shaped - - - - Linden
14. Leaves with one distinct midvein from base - - - - - - - - - - 15
15. Bark on trunk smooth, light gray, leaves serrate - - - - - - - Beech
15. Bark rough on trunk - 16
16. Leaves very oblique at base - - - - - - - - - - - - - - - - - - Elm
16. Leaves not oblique at base - - - - - - - - - - - - - - - - - - - Chestnut
17. Trees with thorns - Hawthorn
17. Trees without thorns - 18
18. Leaves toothed - 19
19. Leaves about as broad as long - - - - - - - - - - - - - - - - - Poplar
19. Leaves longer than broad - 20
20. Buds with single scale twigs yellow green, not bitter - - - - Willow
21. Leaflets entire - 22
21. Leaflets toothed - 23
22. Twigs with spines - Black Locust
22. Twigs with no spines - Tree of Heaven
23. Leaflets five to eleven - Hickory
23. Leaflets eleven to twenty-three - - - - - - - - - - - - - - - - Walnut

TREE OBSERVATION

"The Woods are lovely, dark and deep. ."
Robert Frost

Bark	Buds	Leaf Scars	Leaves	Outstanding Characteristics	Name

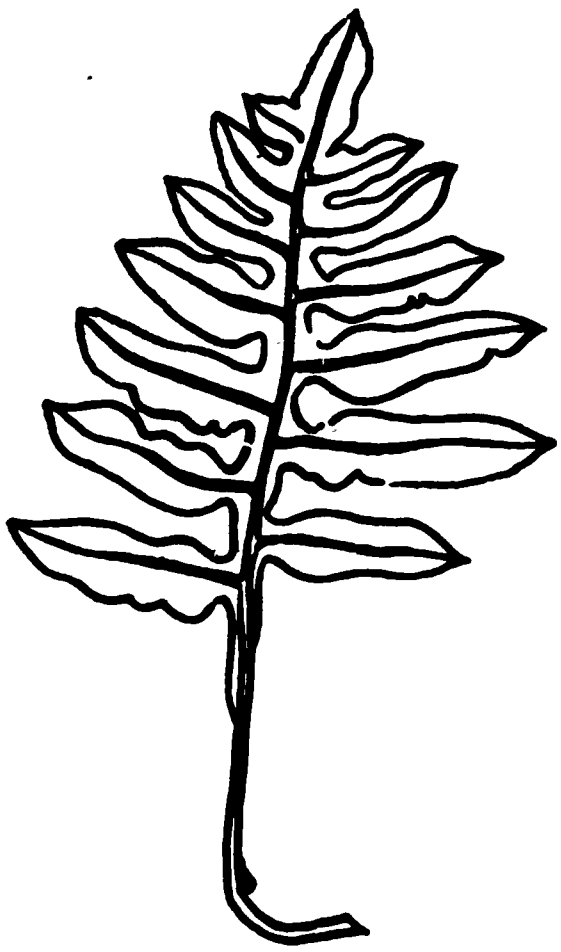
HOW TO KNOW THE TREES WITHOUT LEAVES

A. BUDS OPPOSITE	
B. LARGE (over ½ inch)	BUCKEYE
B. SMALL (½ inch or less)	
C. SCALES MEETING; TWO KINDS OF BUDS PRESENT	FLOWERING DOGWOOD
C. SCALES OVERLAPPING	
D. BUDS OVAL; TERMINAL BUDS IN THREES, WITH MIDDLE BUD MUCH LONGER	MAPLE
D. BUDS FAT, DARK BROWN; TERMINAL BUDS CLUSTERED	ASH
A. BUDS ALTERNATE	
B. SAP MILKY	
1. BUDS TRIANGULAR, WITH RED-BROWN SCALES	MULBERRY
2. BUDS TINY; TWIG ARMED WITH THORNS	OSAGE ORANGE
3. PITH ORANGE; TREE SHRUBBY	SUMAC
B. SAP NOT MILKY	
C. WITH THORNS	
1. THORNS SLENDER, BRANCHED	HONEY LOCUST
2. THORNS IN PAIRS; BUDS SUNKEN	BLACK LOCUST
3. THORNS SINGLE; BUDS TINY	HAWTHORN
C. WITHOUT THORNS	
D. PITH PARTITIONED	
1. PITH LIGHT TAN; BUDS NAKED	WALNUT
2. PITH CHOCOLATE BROWN; BUDS NAKED	BUTTERNUT
3. PITH WHITE; BUDS OVAL, FLATTENED	TULIP TREE
4. PITH PARTITIONS UNEQUAL; BUDS RED-BROWN	TUPELO
D. PITH NOT PARTITIONED	
E. WITH CATKINS	
1. BARK SMOOTH OR PAPERY	BIRCH
2. BARK SHREDDED VERTICALLY	HOPHORNBEAM
3. BARK DARK, WAVY; TWO SIZES OF BUDS	HORNBEAM
E. WITHOUT CATKINS	
F. BUDS CLUSTERED AT TIP OF TWIG	OAK
F. BUDS NOT SO CLUSTERED	
G. WITH DISTINCTIVE TWIGS	
1. TWIGS GREEN, SPICY	SASSAFRAS
2. TWIGS SMOOTH, DARK, BITTER	CHERRY
G. WITHOUT DISTINCTIVE TWIGS	
H. BUDS NAKED; BRIGHT YELLOW	BITTERNUT HICKORY
H. ONE BUD SCALE SHOWING	
1. END BUD LARGE, WOOLLY	CUCUMBER
2. BUD CONICAL, FROM LEAF SCAR	SYCAMORE
3. BUDS REDDISH, APPRESSED	WILLOW
H. TWO BUD SCALES SHOWING	
1. TINY, ROUND BUDS; LARGE LEAF SCAR	AILANTHUS
2. ONE SCALE BULGING, LOPSIDED	BASSWOOD
3. END BUD FAT; SCALES SOFT	PIGNUT HICKORY
H. THREE SCALES SHOWING; BUDS SMOOTH, OVAL; PITH STAR-SHAPED	CHESTNUT
H. MORE THAN THREE SCALES SHOWING	
1. INNER SCALES SOFT GRAY; OUTER WITH LONG POINTS	SHAGBARK HICKORY
2. BUDS BROWN, LONG, SLENDER, SHARP	BEECH
3. SCALES IN TWO VERTICAL ROWS; BUDS TIPPED ASIDE	ELM
4. LONG, SHARP, VARNISHED BUDS	POPULAR

FERNS

Ferns are flowerless plants which grow from a root or rootstock. The rootstocks are underground. The leaves are called fronds. Ferns produce spores instead of seeds. The spores are in spore cases or sporangia and are usually arranged in dotted lines on the back or margins of the fronds. Ferns reproduce by dropping the spores and by new buds developing from the rootstocks.

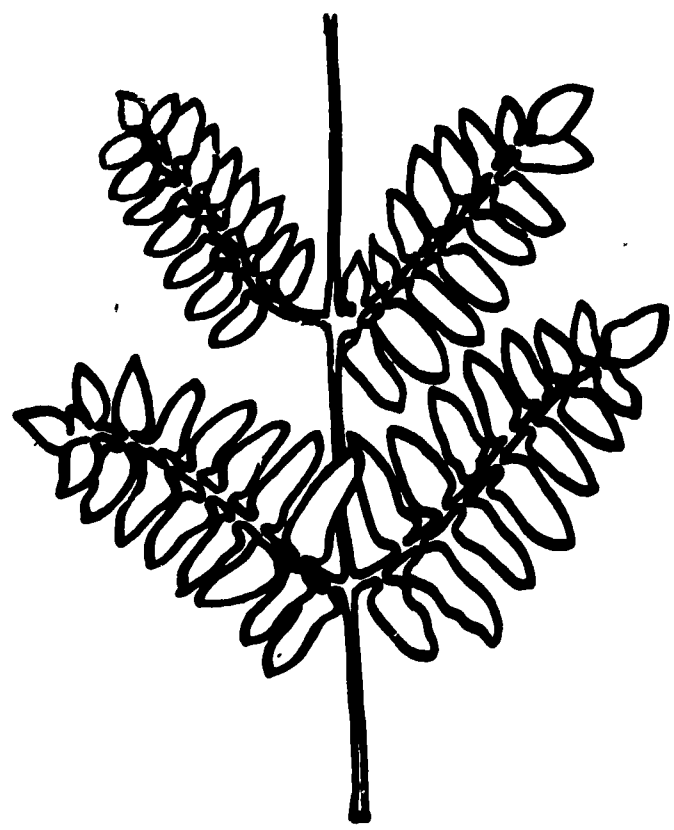
A frond is simple when it consists of an undivided leaf. We could say the frond is uncut.



Some fronds are once cut or once pinnate. A once cut frond is pinnatifid when it forms lobes which are cut half-way or more to the midvein.

Some once cut or once pinnate fronds are cut clear to the midvein. The little leaflets are called pinnae (plural) or pinna (singular).

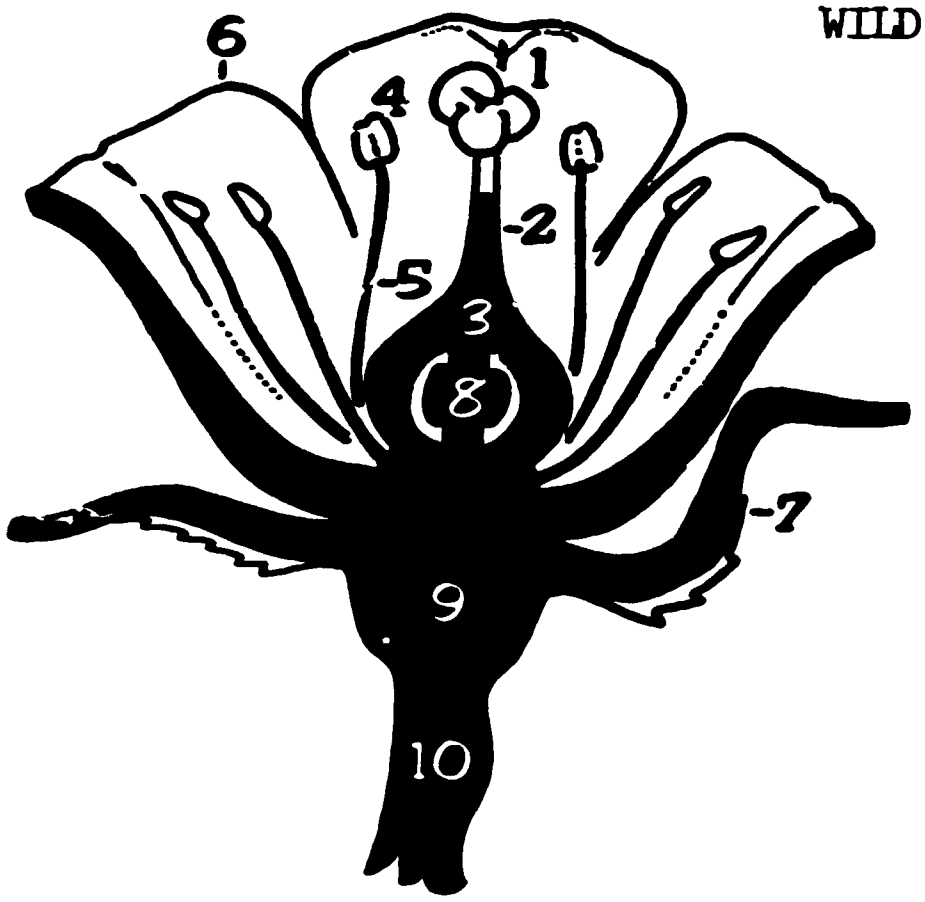
Some fronds are twice cut (twice pinnate) when the pinnae are cut into sub divisions which have their own midveins. These pinnae are divided into smaller leaflets called pinnules.



Some fronds produce spores and are called fertile - others do not and are called sterile. We will find in our study of ecology that ferns are very important in many plant communities.

FERN OBSERVATION

Fertile Fronds	Circle	Sterile Fronds	Circle	Habitat-Notes	Name
	simple once-cut twice-cut		simple once-cut twice-cut		
	simple once-cut twice-cut		simple once-cut twice-cut		
	simple once-cut twice-cut		simple once-cut twice-cut		
	simple once-cut twice-cut		simple once-cut twice-cut		



WILD FLOWER

1. STIGMA
2. STYLE
3. OVARY

} PISTIL

4. ANTHER
5. FILAMENT

} STAMEN

6. PETALS (COLOLLA)
7. SEPALS (CALYX)
8. OVULE
9. RECEPTACLE
10. PEDUNCLE

EXPLANATION OF TERMS

The pistil is the seed bearing organ of the flower. It consists of STIGMA (1), STYLE (2), and OVARY (3).

The stigma is usually the tip of the style. The pollen grains which are deposited upon its moist roughened surface throw out minute tubes which penetrate to the little ovules of the ovary and cause them to ripen into seeds.

The style is the slender stalk above the ovary.

The ovary is the hollow portion at the base of the pistil. It contains the ovules or rudimentary seeds which are quickened into life by the pollen.

The stamens are the fertilizing organs of the flower. A stamen usually consists of its ANTHER (4), the little sac at the lip of the filament which produces the dust-like fertilizing substance called POLLEN; and its FILAMENT (5), or stalk.

The inner flower-cup of the inner set of parts is the corolla.

When the corolla is divided into separate parts, these parts are called PETALS (6).

The greener outer flower cup, which we notice at the base of many flowers is the CALYX. When the calyx is divided into separate parts, these parts are called SEPALS (7).

WILDFLOWER OBSERVATION

"I will be the gladdest thing
Under the sun!
I will touch a hundred flowers
And not pick one."
Edna St. Vincent Millay

Name			
Ecology and Habitat			
Unusual Characteristics			
Flowers			
Leaves			

BIRD OBSERVATION

Size should be one of the first things to be noticed when bird watching. Bird watchers most often refer to three of the most common birds as examples of size. They are the sparrow, robin and crow.

Certainly the next tning that you will notice about a bird is his color. Every species of bird is colored differently than every other species. Therefore, color is probably the most helpful method of identifying a bird. There are two things that will sometimes make it difficult to positively identify a particular bird. They are (1) birds having similar colors or color patterns; and (2) the female of a species is either duller in color or the color pattern is actually different. In each case special care should be taken when observing each bird.

Sometimes a bird is so far off that even with binoculars his image is very small. Sometimes there is not enough light to see his colors. At these times it is helpful to know the silhouettes of some of the more common birds. Learn the silhouettes on this page, and see if they will not help.

As a person becomes more interested in bird watching he will, with more and more practice, learn to identify birds by their song.

Some birds have a flight pattern that is also of some help in identifying them. This method is especially helpful when identifying a general category of birds such as the gliding flights of the hawks.

Habitat is the particular place where any animal lives, including birds. If you think about it you will notice that certain groups of birds are most often seen along a large body of water. Others are seen on or near the ground in a woods while still others live in layers of the trees in the woods. Some live in the lower branches, some partway up the trees and others in the uppermost parts of the trees. Each group lives where it is best suited to survive.

Silhouettes by permission. Roger Tory Peterson, A Field Guide To The Birds. Houghton Mifflin Company, Boston, Mass.

CARDINAL

BLUE JAY

MOURNING DOVE

CROW

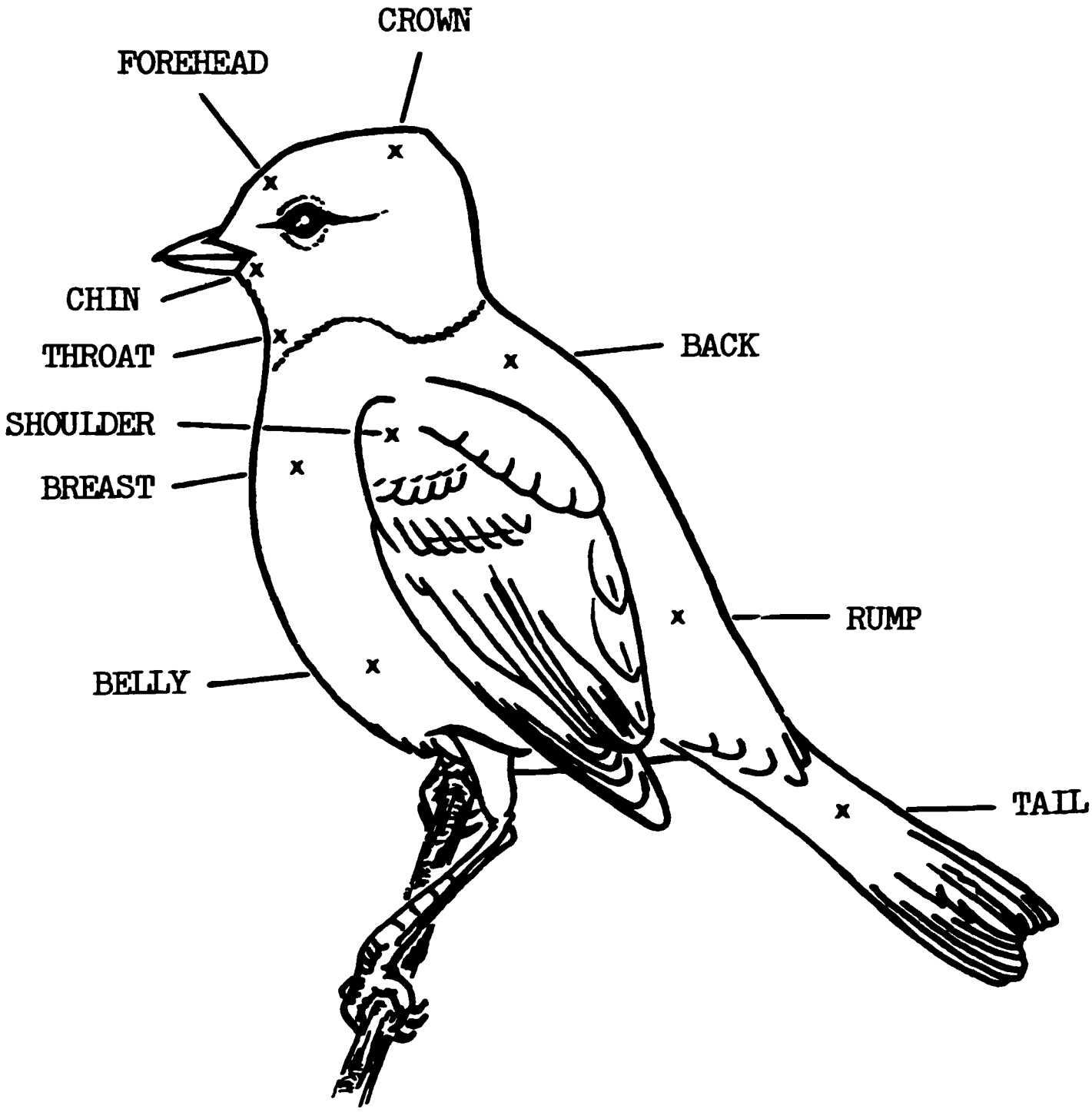
BELTED KINGFISHER

BIRD OBSERVATION

Birds are not just plain birds. There are different kinds of birds. Most of us know the difference between a robin and a cardinal, but how many other birds can we identify? There are many unusual and colorful birds in this part of Ohio. Many times the bird is not in sight long enough to get a bird identification book. Therefore, you must make some quick observations. First, check its size. Compare its size with a robin - is it larger or smaller. If he is larger or smaller than a robin, is he crow size, or sparrow size? Next, what are the predominant color or colors? And what about its shape? Quickly note any outstanding or unusual characteristics. Then you can look it up later for identification.

SIZE	I. C.*	COLOR	SURROUNDING	SONG	FLIGHT PATTERN	NAME

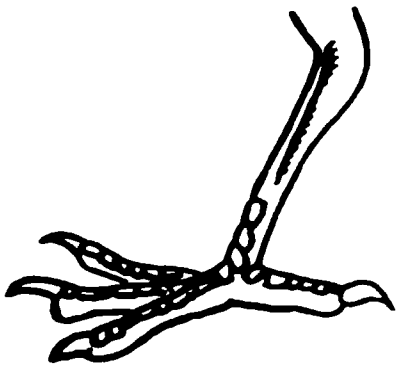
* Identifying Characteristics

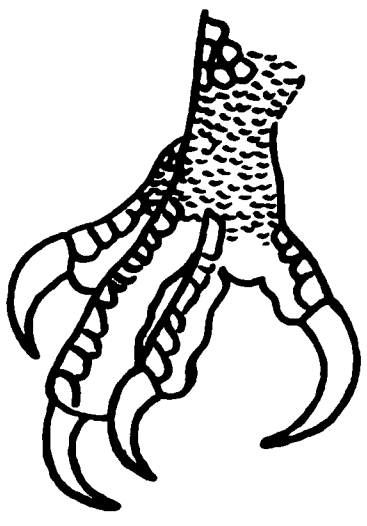


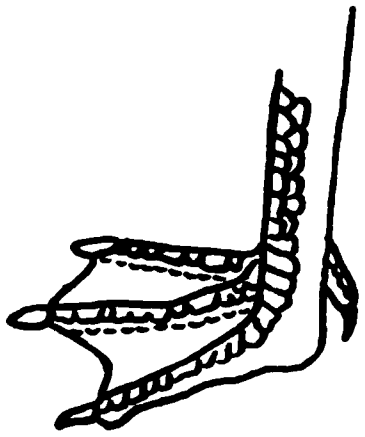
This sketch will help you to learn some of the parts of a bird. If you will learn where they are located, it will help when you want to identify a particular bird.

The next page is designed to help you make some of the major observations that are necessary to identify birds. After you have filled in as many of the blanks as possible, you will want to use one of the simple bird identification books from our library. The best one available is Roger Tory Peterson's book A FIELD GUIDE TO THE BIRDS. Compare your observations with the pictures and descriptions in the book, then name the bird.

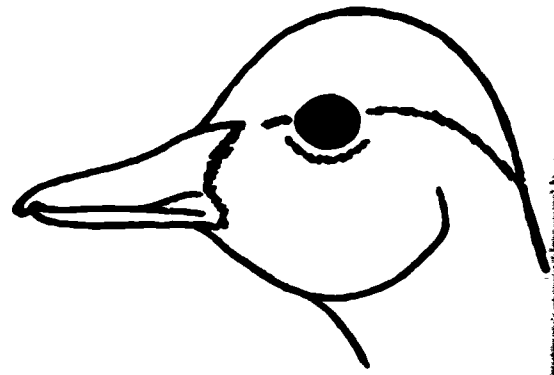
If you are patient and look carefully you will see that different birds are not only colored differently, they also have differently shaped feet and bills. These seemingly small differences allow them to survive in their own particular habitat. It also helps them get their own particular type of food and do it better than almost any other bird. Follow the instructions below and compare how the bird gets its food with the type of foot and bill it has.







	Draw a picture of the bird's foot.	Draw a picture of the bird's bill.	List the type of food that the bird usually eats.



PROBABLE MOHICAN BIRD LIST

BIRDS OF PREY

___BALD EAGLE

___RED TAILED HAWK

___SPARROW HAWK

___RED SHOULDERED HAWK

___TURKEY VULTURE

FIELD BIRDS

___BROWN HEADED COWBIRD

___BOB WHITE QUAIL

___E. MEADOW LARK

___SONG SPARROW

___HORNED LARK

___TREE SPARROW

___HOUSE SPARROW

___VESPER SPARROW

___CHIPPING SPARROW

___FIELD SPARROW

___E. BLUE BIRD

___RED WING BLACKBIRD

___COMMON GRACKLE

___BRONZED GRACKLE

___AM. GOLDFINCH

___BOBOLINK

___STARLING

___MOURNING DOVE

___ROBIN

___YELLOW THR. WARBLER

WOOD BIRDS

___CARDINAL

___EVENING GROSBEAK

___YELLOW SHAFTED FLICKER

___PILEATED WOODPECKER

___RED BELLIED WOODPECKER

___HAIRY WOODPECKER

___DOWNY WOODPECKER

___RED HEADED WOODPECKER

___BLUE JAY

___COMMON CROW

___TUFTED TITMOUSE

___WHT. BRST. NUTHATCH

___RED BRST. NUTHATCH

___CEDAR WAXWING

___SLATE COLORED JUNCO

___WHITE-THR. SPARROW

___WHITE-CRN. SPARROW

___ROSE-BRST. GROSBEAK

___BALTIMORE ORIOLE

___SCARLET TANAGER

___INDIGO BUNTING

___RUFOUS-SIDED TOWHEE

___E. KING BIRD

___CRESTED FLYCATCHER

___E. PHOEBE

___LEAST FLYCATCHER

___E. WOOD PEWEE

___CAT BIRD

___HOUSE WREN

___BROWN THRASHER

___WOOD THRUSH

___OLIVE BACKED THRUSH

___BLACK BILLED CUCKOO

___YELLOW WARBLER

___RED-EYED VIREO

___RED START

BIRDS OF THE SKY

___ROUGH WINGED SWALLOW

___TREE SWALLOW

___BARN SWALLOW

___PURPLE MARTIN

___CHIMNEY SWIFT

___CLIFF SWALLOW

WATER & SHORE BIRDS

___KING FISHER

___COMMON TERN

___HERRING GULL

___PIPING PLOVER

___KILLDEER

___WOODCOCK

___WILSON'S SNIPE

___SPOTTED SANDPIPER

___GR. BLUE HERON

___GREEN HERON

___AM. BITTERN

___AM. COOT

___SCAMP DUCK

___BUFFLE HEAD

___WOOD DUCK

___CANADIAN GEESE

___SNOW & BLUE GEESE

THE IMPORTANCE OF SOIL

Land takes up only 29% of the entire surface of the earth, (and not even all of this is usable). On this amount of land man must grow the things he needs to make everything that he uses for food, clothing and shelter. All of this comes entirely from the sun and the soil. The sun gives off energy in the form of light. This energy is needed by everything that lives and grows. The soil is necessary for two reasons: (1) it is the foothold for the plants we grow; and (2) it is the place where plant nutrients are made and stored.

SOIL PARTS

Soil is made up of four basic and fairly common parts. They are: AIR, WATER, MINERAL and ORGANIC MATERIAL

MINERALS	AIR	WATER
especially	21% OXYGEN	HYDROGEN & OXYGEN
QUARTZ	78% NITROGEN	(H_2O)
FELDSPARS	1% ARGON	

MINERAL MATERIAL

What is the most important source of mineral material? Rocks! We all know that plants can not grow on the surface of a rock. Something must happen first. The rock must be broken down into smaller and smaller pieces until the pieces are the size of a grain of sand or even smaller. This breakdown is called - WEATHERING. There are three kinds of weathering: (1) CHEMICAL, (2) MECHANICAL and (3) ORGANIC. The three most common examples in same order as above are: (1) RAIN - when falling through the atmosphere picks up CARBON DIOXIDE and forms a mild acid known as CARBONIC ACID. (2) ICE - causing pressure in cracks much like that of a wedge, and (3) EARTHWORMS - in an acre area will often pass 40 tons of material through their bodies in a one year period. (In addition to these we should include sunshine, wind, frost, heating and cooling, freezing and thawing, and wetting and drying. All of these in some way cause a weakening of the rock. Often the minerals inside the rock react with air and water. These changes within the rock then set up stresses and strains which weaken the rock even more). This process releases elements which by themselves, or in combinations called minerals, provide plant nutrients.

Of the 92 known natural elements only 8 are commonly found in rock formations. If we could weigh the earth's crust, these 8 elements would make up 98% of its weight. The element most often found is oxygen. It makes up 47% of the earth's crust. Silicon is next, making up 28% of it. (See glossary for complete list.)

ORGANIC MATERIAL

After rain has caused a weakening of the rock surfaces and freed plant nutrients, very primitive plants begin to grow there.

Among the first of these will be the LICHENS followed by MOSSES and FERNS. These are known as PIONEER PLANTS. It is these plants, as they live and die, which make possible the animal life that will soon follow them.

But after a short length of time these first plants and animals will die and other plants and animals will follow them - and die. And so the cycle continues. However, as we know the remains of these plants and animals do not just pile up.

These, too, are broken down into simpler parts which in time return to the soil, air, and water. This decay process is caused by BACTERIA, MOLDS, and FUNGI which are called DECOMPOSERS. As the decomposers work they produce HUMUS, which is the name for the dead, and decaying plant and animal material, and organic wastes, needed to make soil.

SOIL PROFILE

Of the five layers shown on the soil profile sketch only three are really soil. They are: SURFACE SOIL more often called TOPSOIL, SUBSOIL, and SOIL PARENT MATERIAL. (Both HUMUS and BEDROCK lack one of the four necessary parts of true soil. Also, bedrock is solid and unweathered.)

Soil depth around the world averages between five and eight feet. Topsoil depth averages between six and eight inches. The time needed to form one inch of topsoil probably averages about 500 years!

* * * * * * * * * * * * * * * *

The old log in the woods will never be a great tree again. . . things never go back. . . yet, lying there. . . covered with moss. . . it is creating new life. . . which in turn will be great and beautiful. . .

The fish eats the insect. . . the bird the fish. . . the mammal the bird. and. . . the insect the mammal. . . . as each. in a universal rhythm is creating new life . . . . . for there is no life except life which comes from life . . . . . .

Waters flow where daisys grew . . . .

Trees grow where swans once swam . . . . .

All things upon this earth are developing into new things . . . . . from what is here must come what is to be . . . . . there is no other material . . .

This is the fulfilment of the promise of life . . .
. . . . nothing can be destroyed . . . .
everything is being created . . . . . .

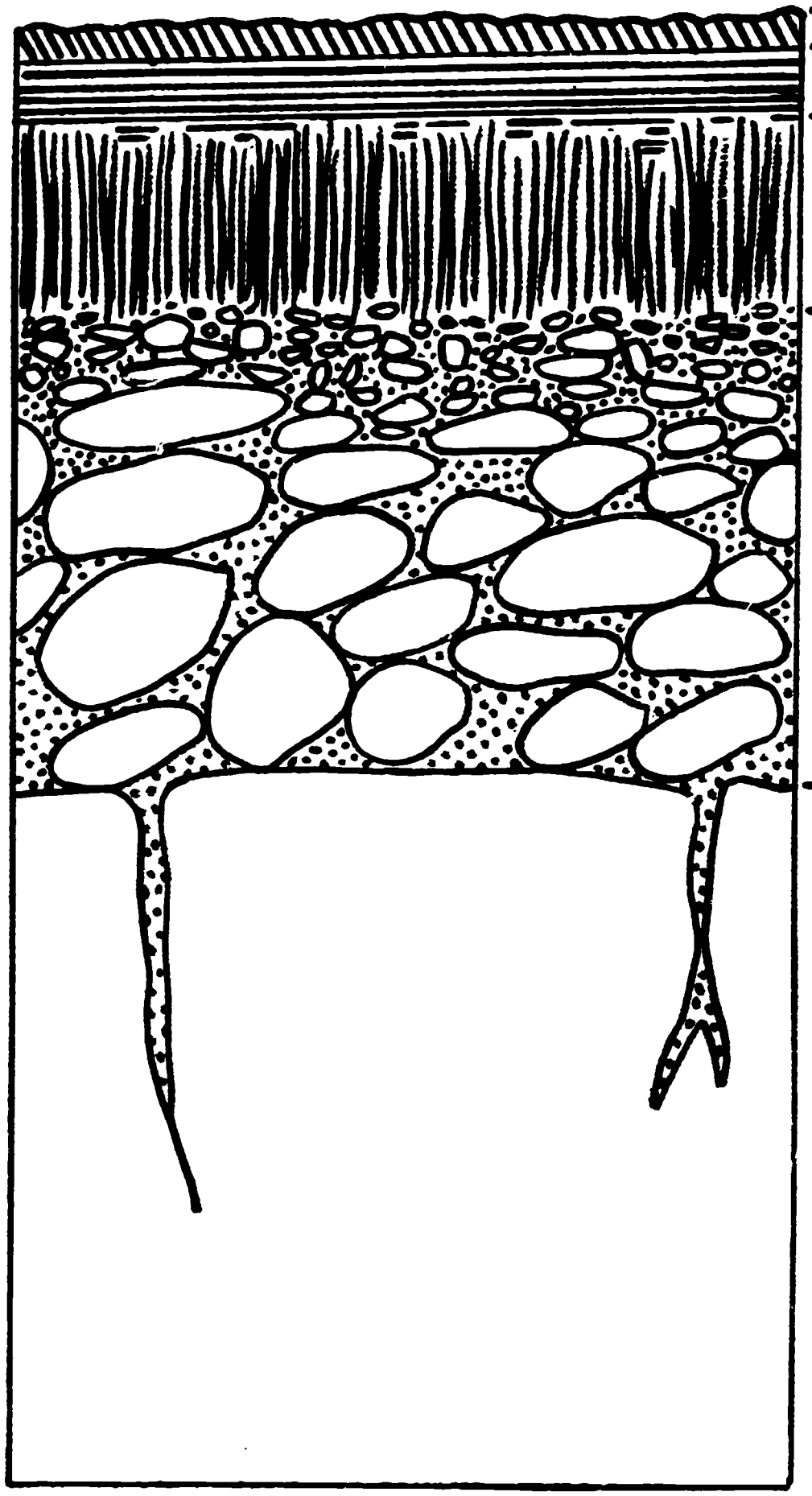
--Gwen Frostic

* * * * * * * * * * * * * * * *

Before these fields were shorn and tilled
Full to the brim our rivers flowed;
The melody of waters filled
The fresh and boundless wood;
And torrents dashed and rivulets played,
And fountains sprouted in the shade.

--Bryant

SOIL PROFILE



HUMUS
SURFACE SOIL
(TOPSOIL)

SUBSOIL

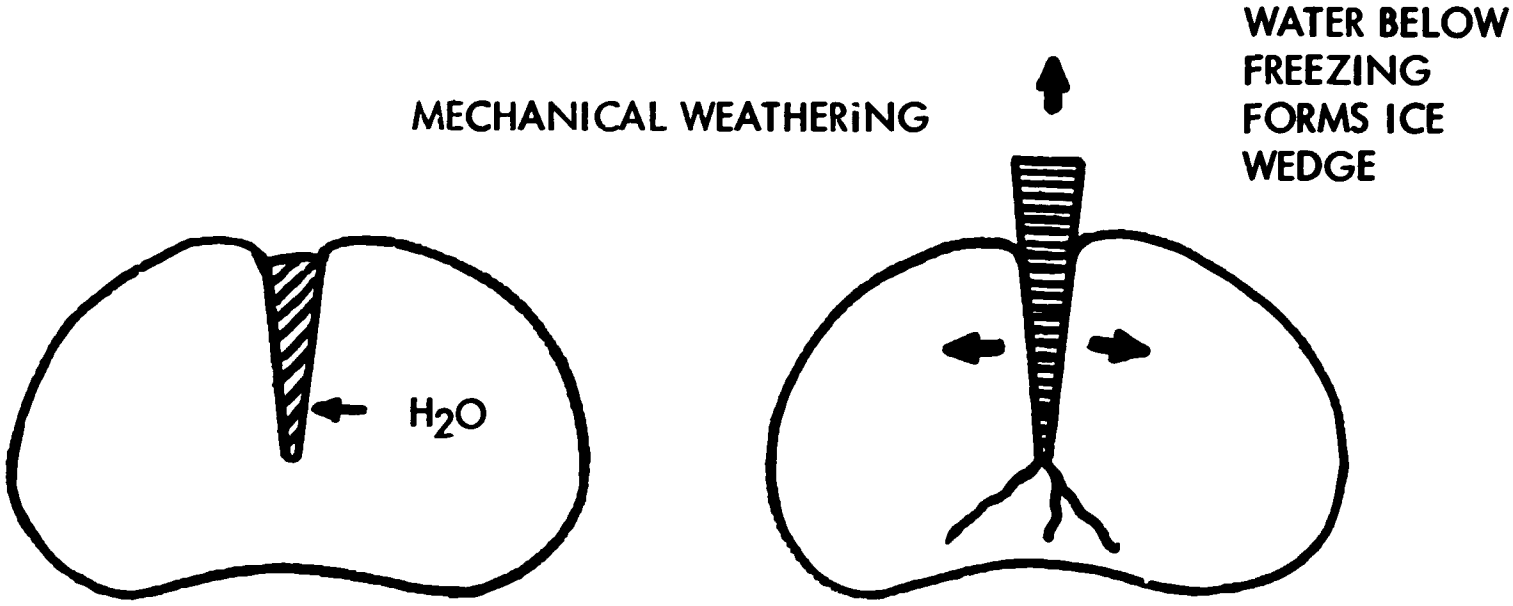
SOLUM

REGOLITH
(MANTLE
ROCK)

SOIL
PARENT
MATERIAL

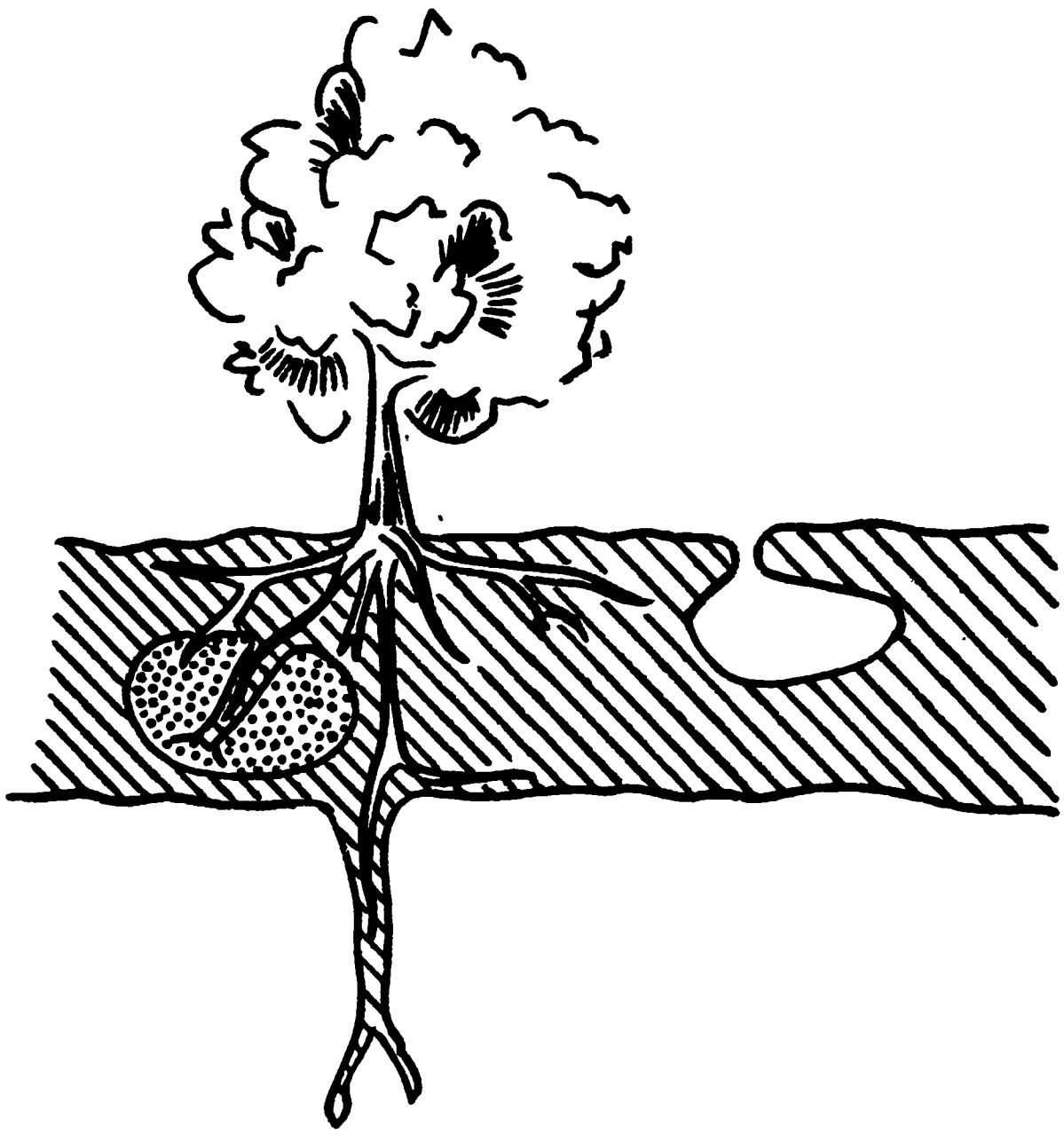
BEDROCK
(PARENT
MATERIAL)

MECHANICAL WEATHERING

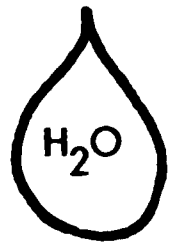


MECHANICAL WEATHERING ALSO INCLUDES DIFFERENTIAL HEATING AND COOLING.

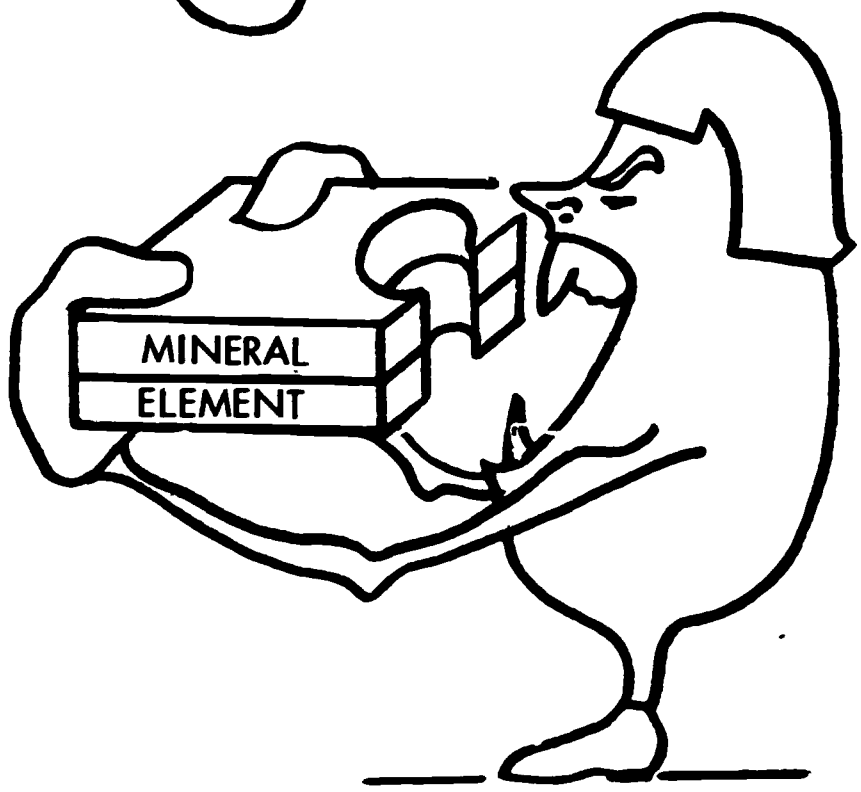
ORGANIC WEATHERING



AIR CONTAINS 21% OXYGEN



+ CARBON DIOXIDE = (CO_2)



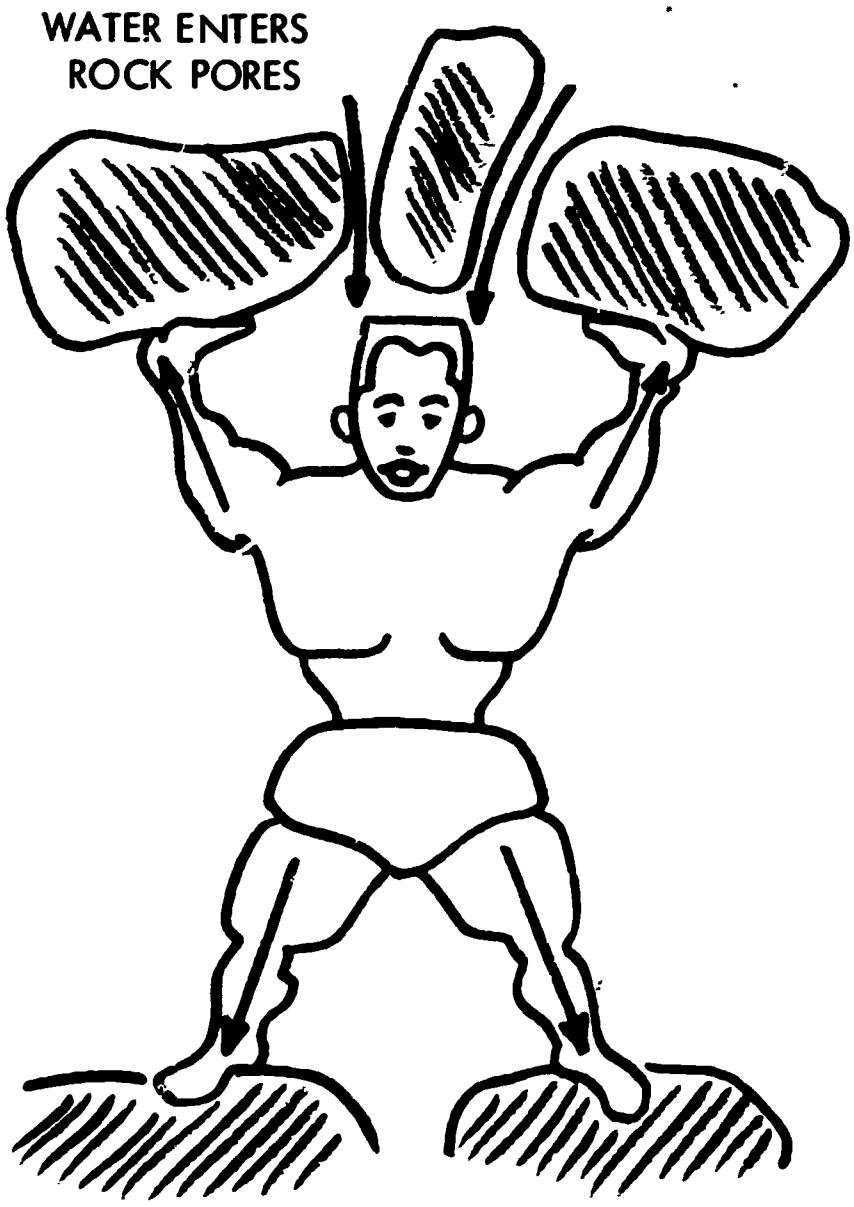
OXIDATION

CARBONIC ACID

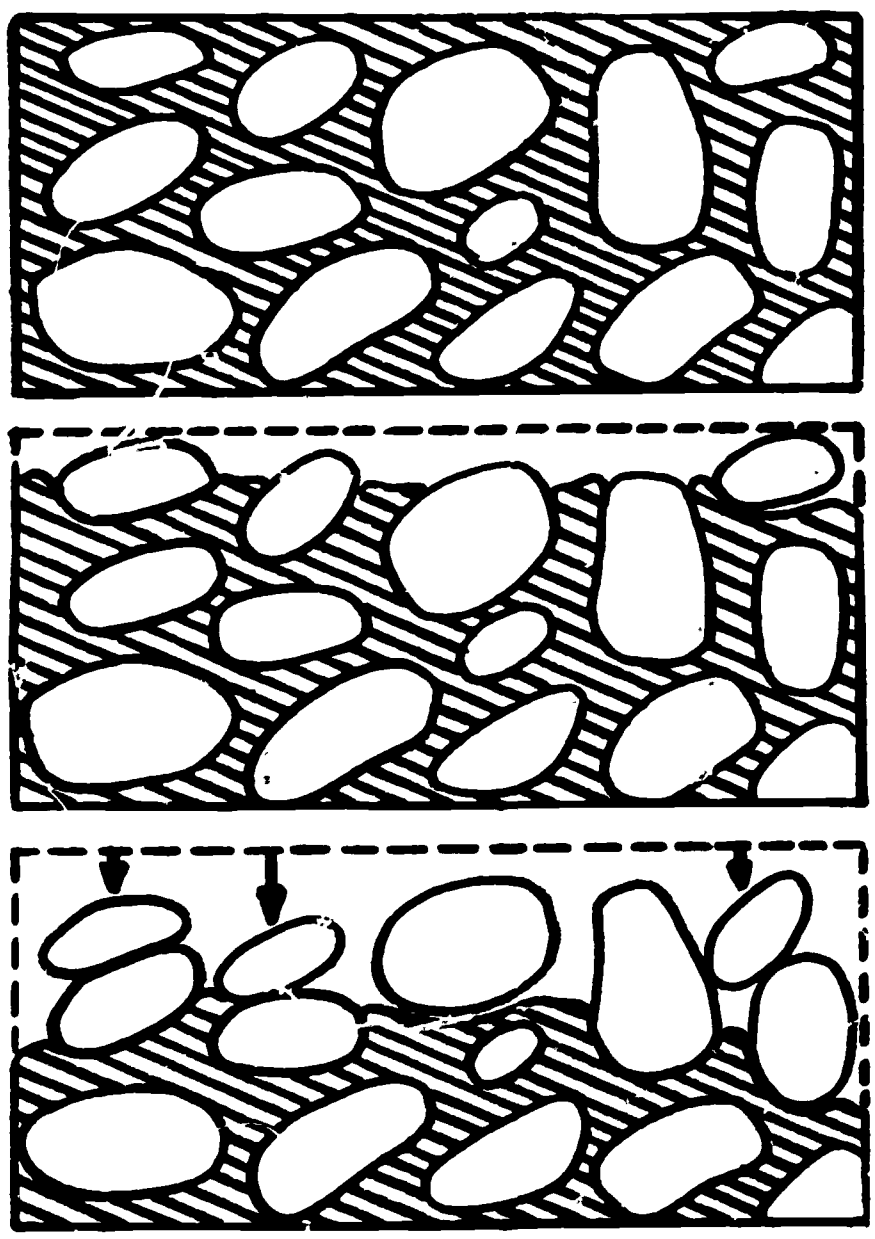
CARBONATION

HYDRATION

WATER ENTERS
ROCK PORES

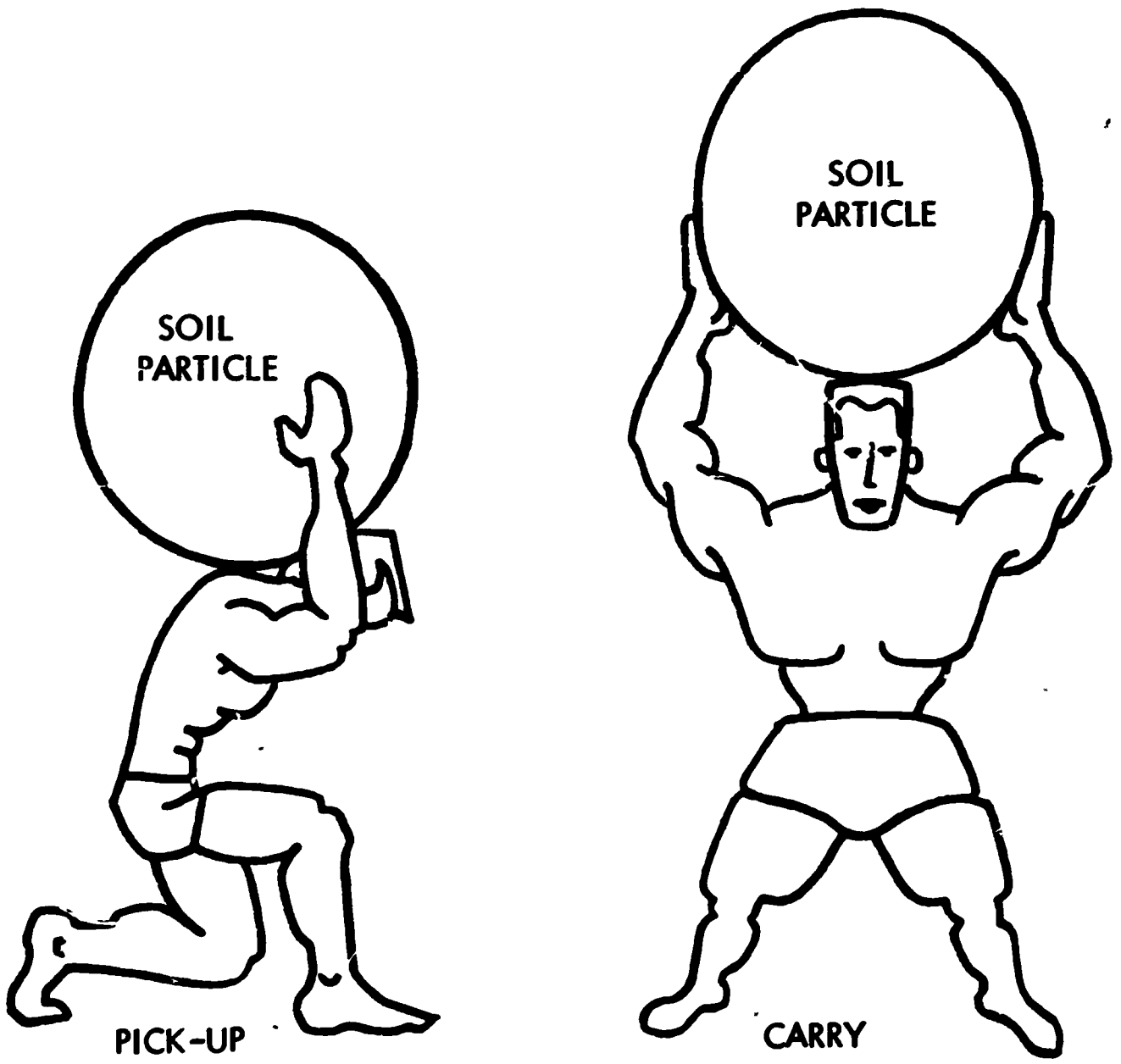


SOLUTION



EROSION

After the breakdown, (weathering), of rock material into smaller and smaller particles, and with the addition of air, water, and decaying plant and animal materials, the soil which results is then capable of making valuable contributions in the support of man and his methods of making a living. However, where there is soil, especially UNCOVERED soil, there is erosion. (The three basic types of erosion are: (1) SHEET EROSION - the top several layers of particles over a large area are removed, (2) RILL EROSION - miniature gullies up to 10 inches deep, and (3) GULLYING a channel whose depth is measured in feet rather than inches.) Erosion is defined as the "pick-up and carry" of soil particles. There are four methods of moving soil particles. GRAVITY is definately the most common over the entire earth. The remaining three are: MOVING water, MOVING air, and MOVING ice. In climates such as ours, except for gravity, moving water is probably the most common agent of erosion. Some natural erosion is bound to occur. However, unnecessary man-caused erosion as a result of plowing, over-grazing, or use of forest resources without reforesting, has cost man unnumbered acres of producing land. While it takes 500 years for nature to form one inch of topsoil, it takes only a few short years for man to allow 500 years of natural soil formation to be washed down our river drainage system. Since soil is an irreplaceable natural resource, this type of erosion must be stopped! This can only be done by a wiser management of the land resources which still remain. This is the responsibility of each and every citizen.



DECOMPOSITION or CHEMICAL WEATHERING includes:

CARBONATION	Certain elements unite with CARBONIC ACID (water + carbon dioxide) and the chemical reaction which results weathers the rocks apart.
HYDRATION	Hydration is the taking on of water in chemical combination; the accompanying "swelling," or increase in bulk, causes the rocks to "give" and fall apart.
OXIDATION	When oxygen in the air unites with certain elements in the rocks causing the original material to weaken and rot.
SOLUTION	Solution is the removal of materials which cement the rock particles together.

DIFFERENTIAL WEATHERING Under a given set of conditions, different kinds of rock will ordinarily weather at different rates because of differences in mineral composition and the degree of ease with which water may penetrate into the rock. Even on an outcrop of a single type of rock the rate of weathering may vary from place to place, either because of minor variations in the composition or texture or because of local differences in the numbers and sizes of joints and crevices that allow penetration of water. If the weathered material is continually being removed, the places of most rapid weathering gradually are etched out to form low spots in the surface, while places where weathering is particularly slow come to stand above the rest.

ELEMENT A substance which has resisted being broken down by CHEMICAL means. Of the 92 known chemical elements which exist in the earth's crust, only 8 are really abundant. These 8 elements make up 98% of the known crust of the earth. They are: OXYGEN - 47%; SILICON - 28%; IRON - 5%; CALCIUM - 4%; and SODIUM, POTASSIUM, and MAGNESIUM - 2-3% each.

EROSION Is the "pick up and carry" process of weathered materials.

FAULTING The displacement (which means to put out the place, move from its usual place or position) of large blocks of the earth's crust along cracks in the earth called joints.

FOLDING Is the wrinkling of the earth's crust, in tight folds, very much like a corrugated roof.

HUMUS It is important to note that the humus is PARTIALLY decayed organic matter; if decay is complete, there is no humus. Humus is usually black in color.

IGNEOUS ROCKS Igneous rocks are those which are molten or have cooled and become solid after being in a molten state. Such rocks are formed within the earth, where temperatures are high enough to melt solid rock. As they cool and solidify, there is time for crystals to grow to relatively large sizes and therefore the rocks are usually coarse grained. Common examples are: GRANITE and BASALT.

JOINT Also, cracks or fractures. But in this case, the joints permit the water of the ground to circulate more freely within the rocks.

METAMORPHIC ROCKS These are rocks which have undergone marked change from their original condition. Most of the change is the result of HEAT and PRESSURE happening occasionally as a result of burial within the earth, assisted by the cementing action of underground waters and quite often by crystal deformation. Changes include: SANDSTONE into QUARTZITE; LIMESTONE into MARBLE; and SHALE into SLATE.

MINERAL Any natural component (part) of the earth's crust. In minerals, the elements are united to form substances which are very different from any of the ingredient elements.

ORGANIC WEATHERING Expanding roots ferret out cracks and crevices and split the rocks; burrowing animals wedge, pry and remove materials.

SEDIMENTARY ROCKS These are made up of sediments, or particles. They represent the accumulation through time of layer on layer of deposited materials. Some are carried and laid down by the wind, others by moving water or glaciers. Most of them are finally laid down in the great accumulation basins of the oceans. Each depositional layer is a STRATUM, and a series of them are STRATA; hence sedimentary rocks are normally referred to as STRATFIELD. Common examples are: SANDSTONE, LIMESTONE, SHALE, and CONGLOMERATE.

STRATA Two or more associated stratum; a series of layers.

STRATUM A single depositional layer.

VULCANISM Has to do with molten rock which may become a volcano or a lava flow or any number of structures UNDER the earth's surface crust.

WEATHERING Is simply the breaking up of rocks by chemical and mechanical means. Basically it is making little pieces of rock out of big ones.

VOCABULARY FOR ECOLOGY AND WEATHER

CLIMATE The average weather conditions of an area
DECOMPOSERS Bacteria and fungi
ECOLOGY The study of living things and their environment
HABITAT The place where a living thing lives
HIBERNATE To spend the winter in a dormant or near dormant state
HUMUS Organic matter, partially decomposed; which is found in soils
PRODUCERS The green plants which supply the basic food for life
CONSUMERS The animals which subsist upon food produced by other organisms
DECIDUOUS A plant that sheds its leaves annually during the same growing season
CONIFEROUS Cone bearing plants
PARASITE An organism living on or within the body of another at the expense of the host
WEATHER The general condition of the atmosphere at a particular time and place
ATMOSPHERE The air surrounding the earth
BACTERIA Non-green, one celled tiny organisms
FUNGI or FUNGUS A group of plants including mildew, molds, mushrooms, rusts and toadstools. They have no leaves, flowers, or green color.
ENVIRONMENT All the conditions which surround a living thing
ORGANISM Any living thing
FAUNA The animals living in a certain place
MAXIMUM The highest degree or point recorded
MINIMUM The lowest degree or point recorded
HUMIDITY The amount of moisture in the air
BAROMETER An instrument for measuring atmospheric pressure
THERMOMETER An instrument for measuring temperatures
ATMOSPHERIC PRESSURE The pressure due to the weight of the earth's atmosphere
PRECIPITATION Rain, snow, sleet or moisture

1. What percentage of the earth is land?
   (1) _____

2. What three things come entirely from the sun and the soil?
   (1) _____
   (2) _____
   (3) _____

3. Give two reasons why soil is necessary.
   (1) _____
   (2) _____

4. What are the four soil parts?
   (1) _____
   (2) _____
   (3) _____
   (4) _____

5. Name the most important source of mineral material.
   (1) _____

6. Another word that means the breakdown of rocks into smaller and smaller pieces.
   (1) _____

7. Give three examples of the above.
   (1) _____
   (2) _____
   (3) _____

8. This is formed when rain and carbon dioxide combine.
   (1) _____

9. List the four kinds of chemical weathering.
   (1) _____
   (2) _____
   (3) _____
   (4) _____

10. What happens when water freezes?
    (1) _____

11. List the two most common elements found in the earth's crust.
    (1) _____
    (2) _____

12. List the six other elements and percentages commonly found in the earth's crust.
    (1) _____
    (2) _____
    (3) _____
    (4) _____
    (5) _____
    (6) _____

13. Name three primitive plants.
    (1) _____
    (2) _____
    (3) _____

14. What are these plants called?
    (1) _____

15. Three things that aid the decay process.
    (1) _____
    (2) _____
    (3) _____

16. What are they called? (1) _____

17. What is another word for dead and decaying plant and animal material and organic wastes? (1) _____

18. List the five layers in the soil profile.
(1) _____
(2) _____
(3) _____
(4) _____
(5) _____

19. Which of these layers are the "true soil" layers:
(1) _____
(2) _____
(3) _____

20. How deep is the average soil? (1) _____

21. How deep is the average topsoil? (1) _____

22. How long does it take nature to form one inch of topsoil? (1) _____

23. Where is it easiest for erosion to happen? (1) _____

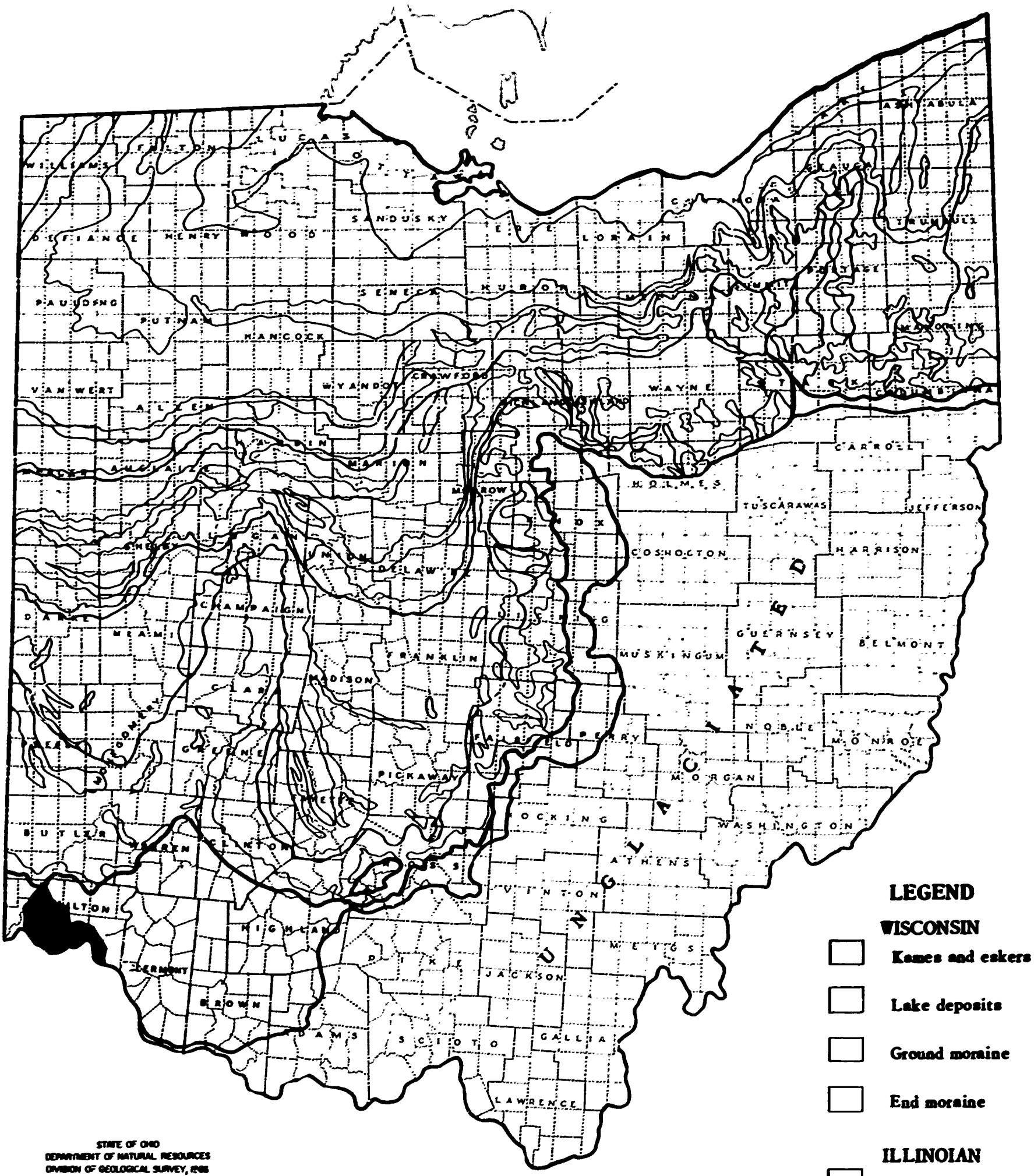
24. List three kinds of erosion.
(1) _____
(2) _____
(3) _____

25. How is erosion defined? (1) _____
_____

26. What are four ways of moving soil particles?
(1) _____
(2) _____
(3) _____
(4) _____

27. Besides gravity what is the most common agent of erosion in our climate? (1) _____

28. What kind of natural resource is our soil? (1) _____



STATE OF OHIO
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF GEOLOGICAL SURVEY, 1965

0 10 20 30 miles
Scale

ADAPTED FROM GLACIAL MAP OF OHIO,
U.S. GEOL. SURVEY MISC. GEOL. INV. MAP I-316

LEGEND

WISCONSIN

- Kames and eskers
- Lake deposits
- Ground moraine
- End moraine

ILLINOIAN

- Undifferentiated

KANSAN

- Ground moraine

GLACIAL DEPOSITS OF OHIO

EVERGREEN TRAIL

PLANT	GROWTH TYPE	UNUSUAL CHARACTERISTICS	ECOLOGY & HABITAT

WEATHER
HOW TO ESTIMATE WIND SPEED

Name of Wind	Speed Miles per Hour	Specifications
Calm	Less than 1	Smoke rises straight up. Trees and bushes do not move. A lake looks as smooth as a mirror.
Light Air	1 to 3	Wind direction shown by drift of smoke, but not by wind vane. Tree leaves barely move.
Light Breeze	4 to 7	Wind felt on face. Leaves rustle slightly. Ordinary wind vane moves.
Gentle Breeze	8 to 12	Leaves and twigs in constant motion. Wind extends light flags.
Moderate Breeze	13 to 18	Dust, loose paper, and small branches are moved.
Fresh Breeze	19 to 24	Small limbs in trees begin to sway. Dust clouds raised. Crested wavelets form on inland waters.
Strong Breeze	25 to 31	Large branches in motion. Whistling heard in wires. Umbrellas used with difficulty.
Moderate Gale	32 to 38	Whole trees in motion. Inconvenience felt in walking against wind.
Fresh Gale	39 to 46	Twigs break off trees. Walking is impeded.
Strong Gale	47 to 54	Slight structural damage occurs. Chimney pots and slate blown off.
Whole Gale	55 to 63	Seldom experienced inland. Trees uprooted. Considerable structural damage inflicked.
Storm	64 to 74	Rarely experienced. Widespread damage.
Hurricane	75 or more	Excessive damage and destruction.

NOTE: A wind of 75 miles an hour or more is said to be of hurricane force, although it may not be associated with a hurricane itself.

GENERAL RULES FOR FORECASTING

Look for fair weather to continue if:
Clouds tend to decrease in number
The winds blow gently from the directions of west to northwest
The temperature is normal for the time of year
The barometer is steady or slowly rising
The setting sun looks like a ball of fire and the sky is clear
The moon shines brightly and the wind is light
There is heavy dew or frost at night

Look for weather to change for the worse if:
Cirrus clouds change into cirrostratus, and cloudiness thickens and darkness to the west or southwest
Quickly moving clouds increse in number and lower in elevation
Clouds move in various directions at different elevations
Clouds move from the south and the southerly wind increases in speed
The sky is clear at sunset, the wind speed light, and the air moist (look for fog)
The wind blows strongly in the morning
The temperature rises conspicuously in the winter
The barometer falls steadily
There is a hard rainfall at night

Look for clearing weather when:
A cloud filled sky shows signs of clearing up
The barometer rises rapidly
The wind shifts to a westerly direction

Look for rain or snow when:
18 to 36 hours after the first cirrus clouds are spotted in the sky (provided they thicken and give way to lower clouds)
12 to 24 hours after cirrus clouds thicken into cirrostratus and a halo is seen around the sun or moon
Within 6 hours when the morning temperature is high; the air is moist and sticky
Within 1 hour in the afternoon when there are swelling cumulus clouds overhead, and a dark sky to the southwest

Look for the temperature to fall when:
The wind continues to blow from the north or northwest
The pressure rises (in winter)
The wind is light and the evening sky is clear
The wind shifts into the north or northwest

Look for the temperature to rise when:
The sky is filled with clouds at night and there's a moderately southerly wind
The sky is clear all day and the wind is from the south
The wind shifts from the northwest to the south

WEATHER READINGS

Day_____ Morning_____ Noon_____ Afternoon_____

The minimum temperature yesterday was 1._____ degrees and occurred at 2._____. The maximum temperature yesterday was 3._____degrees and occurred at 4._____. The barometric pressure is 5._____inches and 6._____. The wind is coming out of the 7._____at 8._____ miles per hour. The present temperature is 9._____degrees. The relative humidity is 10._____per cent. The precipitation type was 11._____and measured 12._____ of an inch.

Cloud Type_____
Amount of cloud type_____

_____

Visibility_____

Reduced by_____

Dry Bulb_____

Wet Bulb_____

Difference_____

= = = = = =

Prediction

_____

_____

_____

_____

_____

_____

_____

_____

Day_____ Morning_____ Noon_____ Afternoon_____

The minimum temperature yesterday was 1._____degrees and occurred at 2._____. The maximum temperature yesterday was 3._____degrees and occurred at 4._____. The barometric pressure is 5._____inches and 6._____. The wind is coming out of the 7._____at 8._____ miles per hour. The present temperature is 9._____degrees. The relative humidity is 10._____per cent. The precipitation type was 11._____and measured 12._____ of an inch.

Cloud Type_____
Amount of cloud type_____

_____

Visibility_____

Reduced by_____

Dry Bulb_____

Wet Bulb_____

Difference_____

= = = = = =

Prediction

_____

_____

_____

_____

WEATHER READINGS

Day_____ Morning_____ Noon_____ Afternoon_____

The minimum temperature yesterday was 1._____degrees and occurred at 2._____. The maximum temperature yesterday was 3._____degrees and occurred at 4._____. The barometric pressure is 5._____inches and 6._____. The wind is coming out of the 7._____at 8._____ miles per hour. The present temperature is 9._____degrees. The relative humidity is 10._____per cent. The precipitation type was 11._____and measured 12._____ of an inch.

Cloud Type_____
Amount of cloud type_____

Visibility_____

Reduced by_____

Dry Bulb_____

Wet Bulb_____

Difference_____

= = = = = =

Prediction

_____

_____

_____

_____

Day_____ Morning_____ Noon_____ Afternoon_____

The minimum temperature yesterday was 1._____degrees and occurred at 2._____. The maximum temperature yesterday was 3._____degrees and occurred at 4._____. The barometric pressure is 5._____inches and 6._____. The wind is coming out of the 7._____at 8._____ miles per hour. The present temperature is 9._____degrees. The relative humidity is 10._____per cent. The precipitation type was 11._____and measured 12._____ of an inch.

Cloud Type_____
Amount of cloud type_____

Visibility_____

Reduced by_____

Dry Bulb_____

Wet Bulb_____

Difference_____

= = = = = =

Prediction

_____

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Relative Humidity, Per Cent—Fahrenheit Temperatures

Dry Bulb temp.	Difference (Wet Bulb Depression)																			
t	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0	9.5	10.0	10.5
20	92	85	77	70	62	55	48	40	33	26	19	12	5								
21	92	85	78	71	63	56	49	42	35	28	21	15	8	1							
22	93	86	78	71	65	58	51	44	37	31	24	17	11	4							
23	93	86	79	72	66	59	52	46	39	33	26	20	14	7	1						
24	93	87	80	73	67	60	54	47	41	35	29	22	16	10	4						
25	94	87	81	74	68	62	55	49	43	37	31	25	19	13	7	1					
26	94	87	81	75	69	63	57	51	45	39	33	27	21	16	10	4					
27	94	88	82	76	70	64	58	52	47	41	35	29	24	18	13	7	2				
28	94	88	82	76	71	65	59	54	48	43	37	32	26	21	15	10	5				
29	94	88	83	77	72	66	60	55	50	44	39	34	28	23	18	13	8	3			
30	94	89	83	78	73	67	62	56	51	46	41	36	31	26	21	16	11	6	1		
31	94	89	84	78	73	68	63	58	52	47	42	37	33	28	23	18	13	8	4		
32	95	89	84	79	74	69	64	59	54	49	44	39	35	30	25	20	16	11	7	2	
33	95	90	85	80	75	70	65	60	56	51	46	41	37	32	27	23	18	14	9	5	0
34	95	90	86	81	76	71	66	62	57	52	48	43	38	34	29	25	21	16	12	8	3
35	95	91	86	81	77	72	67	63	58	54	49	45	40	36	32	27	23	19	14	10	6
36	95	91	86	82	77	73	68	64	60	55	51	46	42	38	34	29	25	21	17	13	9
37	95	91	87	83	78	74	69	65	61	57	53	48	44	40	36	31	27	23	19	15	11
38	96	91	87	83	79	75	70	66	62	58	54	50	46	42	37	33	29	25	21	17	14
39	96	92	87	83	79	75	71	67	63	59	55	51	47	43	39	35	31	27	24	20	16
40	96	92	87	83	79	75	71	68	64	60	56	52	48	45	41	37	33	29	26	22	18
41	96	92	88	84	80	76	72	69	65	61	57	54	50	46	42	39	35	31	28	24	20
42	96	92	88	85	81	77	73	69	65	62	58	55	51	47	44	40	36	33	30	26	23
43	96	92	88	85	81	77	73	70	66	63	59	55	52	48	45	42	38	35	31	28	25
44	96	93	89	85	81	78	74	71	67	63	60	56	53	49	46	43	39	36	33	30	26
45	96	93	89	86	82	78	74	71	67	64	61	57	54	51	47	44	41	38	34	31	28
46	96	93	89	86	82	79	75	72	68	65	61	58	55	52	48	45	42	39	35	32	29
47	96	93	89	86	82	79	75	72	69	66	62	59	56	53	49	46	43	40	37	34	31
48	96	93	90	86	83	79	76	73	69	66	63	60	57	54	50	47	44	41	38	35	32
49	96	93	90	86	83	80	76	73	70	67	64	61	57	54	51	48	45	42	39	36	34
50	96	93	90	87	83	80	77	74	71	67	64	61	58	55	52	49	46	43	41	38	35
51	97	94	90	87	84	81	78	75	71	68	65	62	59	56	53	50	47	45	42	39	36
52	97	94	90	87	84	81	78	75	72	69	66	63	60	57	54	51	49	46	43	40	37
53	97	94	90	87	84	81	78	75	72	69	66	63	61	58	55	52	50	47	44	41	39
54	97	94	91	88	85	82	79	76	73	70	67	64	61	59	56	53	50	48	45	42	40
55	97	94	91	88	85	82	79	76	73	70	68	65	62	59	57	54	51	49	46	43	41
56	97	94	91	88	85	82	79	76	73	71	68	65	63	60	57	55	52	50	47	44	42
57	97	94	91	88	85	82	80	77	74	71	69	66	63	61	58	55	53	50	48	45	43
58	97	94	91	88	85	83	80	77	74	72	69	66	64	61	59	56	54	51	49	46	44
59	97	94	91	89	86	83	80	78	75	72	70	67	65	62	59	57	55	52	49	47	45
60	97	94	91	89	86	83	81	78	75	73	70	68	65	63	60	58	55	53	50	48	46
61	97	94	92	89	86	84	81	78	76	73	71	68	65	63	61	58	56	54	51	49	47
62	97	94	92	89	86	84	81	79	76	74	71	69	66	64	61	59	57	54	52	50	47
63	97	95	92	89	87	84	82	79	77	74	71	69	67	64	62	60	57	55	53	50	48
64	97	95	92	90	87	84	82	79	77	74	72	70	67	65	63	60	58	56	53	51	49
65	97	95	92	90	87	85	82	80	77	75	72	70	68	66	63	61	59	56	54	52	50
66	97	95	92	90	87	85	82	80	78	75	73	71	68	66	64	61	59	57	55	53	51
67	97	95	92	90	87	85	83	80	78	75	73	71	69	66	64	62	60	58	56	53	51
68	97	95	92	90	88	85	83	80	78	76	74	71	69	67	65	62	60	58	56	54	52
69	97	95	93	90	88	85	83	81	79	76	74	72	70	67	65	63	61	59	57	55	53
70	98	95	93	90	88	86	83	81	79	77	74	72	70	68	66	64	61	59	57	55	53
71	98	95	93	90	88	86	84	81	79	77	75	72	70	68	66	64	62	60	58	56	54
72	98	95	93	91	88	86	84	82	79	77	75	73	71	69	67	65	63	61	59	57	55
73	98	95	93	91	88	86	84	82	80	78	75	73	71	69	67	65	63	61	59	57	55
74	98	95	93	91	89	86	84	82	80	78	76	74	71	69	67	65	63	61	60	58	56
75	98	96	93	91	89	86	84	82	80	78	76	74	72	70	68	66	64	62	60	58	56
76	98	96	93	91	89	87	84	82	80	78	76	74	72	70	68	66	64	62	61	59	57
77	98	96	93	91	89	87	85	83	81	79	77	74	72	71	69	67	65	63	61	59	57
78	98	96	93	91	89	87	85	83	81	79	77	75	73	71	69	67	65	63	62	60	58
79	98	96	93	91	89	87	85	83	81	79	77	75	73	71	69	68	66	64	62	60	58
80	98	96	94	91	89	87	85	83	81	79	77	75	74	72	70	69	66	64	62	61	59